

Assessment of the Managerial Capacity of the Cairo General Organization for Sanitary Drainage

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FORWARD

Collaborative Approaches for Resolving Water Issues



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EXECUTIVE SUMMARY

Assessment Purpose and Methodology

This report provides an assessment of the current managerial capacity of the Greater Cairo General Organization for Sanitary Drainage (CGOSD) to carry out its intended mandates under the various presidential decrees that established it as a general organization to perform a defined public service.

In this regard, it is not an evaluation of what has come before, in terms of technical decisions made relative to the system, its sizing, processes and configuration; nor is it an evaluation focused on pointing out CGOSD's institutional deficiencies. In addition, the assessment does not seek to gain a consensus and commitment of any kind from CGOSD's management to undertake any specific course of action.

The purpose of the assessment, as commissioned by the U.S. Agency for International Development, was to provide an additional tool for CGOSD to use in becoming a purpose-driven, results-oriented economic authority.

The basic methodology of the assessment was to compare CGOSD along a variety of defined functional areas that are common to a publicly owned and operated wastewater utility. The basic information used in making the assessment was the result of an extensive interview program that cut across the entire spectrum of current functional activities of CGOSD and solicited input from a variety of levels of the organization.

This assessment, which was conducted over an intensive five-week period, would not have been successfully completed without the full and open cooperation of CGOSD. The assessment team is indebted to the CGOSD staff, and to the open and cooperative atmosphere created by the Chairman of CGOSD in enabling the assessment team to undertake this effort.

Assessment of Current Managerial Capacity

The assessment considered thirteen specific assessment tasks as defined in the terms of reference of the assessment requested by USAID. Each of these tasks was addressed and is presented with individually documented observations and assessments in the detailed report.

The mission of CGOSD is to protect public health and the environment through proper wastewater collection, treatment, and environmentally safe disposal. Although significant progress has been made by the utility in the past fifteen years in meeting its mission by transporting wastewater away from its sources, based on the findings of this assessment, it is safe to conclude that the mission of CGOSD is not fully met. A considerable portion of the wastewater collected still receives no treatment.

In addition, there is clear evidence that a deterioration of the substantial investment made by Egypt in wastewater infrastructure has begun, and with that will come a reduction in the quality of the service and most likely frequent system failures. To cope with this one critical issue of operational sustainability is a major task. However, CGOSD is also faced with an equally serious financial sustainability issue that must be addressed in the near-term.

What the assessment team endeavored to determine was whether CGOSD, as a utility providing an essential public service, was properly empowered, structured, organized, and managed to be what is routinely referred to as a “self-sustaining utility.” The “bottom line” of the assessment is that, for specific operational and fiscal reasons, CGOSD cannot be considered to be a self-sustaining utility. As a result of that determination, CGOSD could fail to achieve its mission objectives.

Recommended Solution Model

In light of the above stated assessment, the assessment team has structured the following solution model to address these root issues and present a summary solution strategy for all parties interested in the successful functioning of CGOSD as a wastewater utility.

OPERATIONAL SUSTAINABILITY	FINANCIAL SUSTAINABILITY
<p>The system is running (pumping), however it is slowly but steadily deteriorating because of inadequate maintenance and planned corrective maintenance.</p>	<p>The near-term capital needs — plus rapidly rising O&M costs — will only result in a larger national subsidy to CGOSD which undermines credit-worthiness.</p>
<p>Increasing risk of operational failures with the associated political consequences.</p>	<p>Under funding of capital and/or O&M expenses which will result in a reduced level of services.</p>
<p>Initiate a rapid change in the way the assets are protected and operated:</p> <ul style="list-style-type: none"> • Internal performance improvement • Contract all operational services 	<p>Institute true enterprise-based financial management with cost-center-based accounting, and implement a revenue program to eliminate the national subsidy.</p>

Implementation Strategy

The recommended implementation strategy actions that have been developed as a result of this assessment have been grouped into three categories as follows:

Policy Actions Required

This category requires the action of higher levels of government (approvals or changes in law) or the direct policy action of the CGOSD Board of Directors

Technical Assistance Actions Required

The actions under this category are defined to require serious, external intervention of expertise that is not currently available within CGOSD or cannot be hired by CGOSD on an employment basis at this time.

CGOSD Internal Actions Required

This category presents actions that CGOSD can largely undertake at this time, within its current authority and using the expertise of personnel that it already has under employment.

Specific actions under each of these categories are presented in a matrix table at the end of this executive summary. This table defines the need, action task, approach, and timeframe for completion.

RECOMMENDATIONS AND IMPLEMENTATION STRATEGY SUMMARY FOR CGOSD

Item No.	Need	Task	Approach	Estimated Timeframe to Complete
POLICY ACTIONS REQUIRED:				
1	To change CGOSD governance to make it an autonomous and sustainable utility with a responsible Board of Directors comprised of stakeholders.	Convert the powers included in Presidential Decree No. 95 to national law and reconstitute the Board of Directors.	This will require the support of the Greater Cairo governorates and the Prime Minister, as well as the Chairman.	18 months
2	To upgrade the level of system performance and sustainability by utilizing outside expertise through service contracts and management contracts.	Contract with an outside international service provider for operation and maintenance of all major pump station and WWTP facilities.	Contract with outside O&M service organization to work in partnership with CGOSD or an Egyptian firm to assume guaranteed performance responsibilities for all critical system facilities.	6 to 12 months to contract; contractual service to be reviewed at the end of 10 years and be terminated or continued at that time.
TECHNICAL ASSISTANCE ACTIONS REQUIRED:				
3	To make better use of financial data and utilize it for financial forecasting and management.	Implement financial management system and convert to cost-center, computer-based accounting.	Contract with a qualified financial manager to provide this service.	12 months

RECOMMENDATIONS AND IMPLEMENTATION STRATEGY SUMMARY FOR CGOSD

Item No.	Need	Task	Approach	Estimated Timeframe to Complete
4	To provide O&M with the computer-based tools to efficiently conduct its activities.	Complete the installation of MP-2, the inventory control system and the collection network mapping.	Contract with a private sector service provider to work with the O&M staff to convert MP-2 to Arabic, complete the coding and data entry for inventory control, and continue the protocol for mapping the collection system.	6 months to contract 2 years to complete
5	To establish sectors and major facilities as cost centers with responsibility for operation, maintenance, personnel, budgeting and stores.	Restructure core business organization to improve efficiency and effectiveness.	Chairman can delegate authority to sector managers and contract with management firms for support services and shadow managers.	24 months
6	To separate line functions from support functions and place all support functions in a new department.	Establish a technical services Department to include laboratories, industrial wastes, central stores, MIS, monitoring and compliance reporting.	If the chairman cannot create a new department until CGOSD becomes autonomous, the technical services function can be accomplished by contracting for a technical services manager.	12 months
7	To form a group with the responsibility for immediate development of a strategic plan and its long term implementation and revision.	Create an Office of Strategic Planning and prepare and maintain a strategic plan.	The chairman can assign key staff supported by outside contracted skills.	Establish within 6 months with CGOSD assuming full responsibility within 3 years.

RECOMMENDATIONS AND IMPLEMENTATION STRATEGY SUMMARY FOR CGOSD

Item No.	Need	Task	Approach	Estimated Timeframe to Complete
CGOSD INTERNAL ACTIONS REQUIRED:				
8	To relieve the chairman of day-to-day decisions regarding operations and maintenance of the system so that he can concentrate on financial and administrative problems.	Create a position of Chief Operating Officer (COO). The Chairman would be designated Chief Executive Officer (CEO).	The chairman would establish the position of COO to be responsible for operations and maintenance and be the second in command to the chairman who would be designated Chief Executive Officer (CEO).	6 months
9	Information on performance and efficiency of operations to be organized and analyzed in a manner to provide the CEO and COO with a suitable basis for key decisions.	Establish the Office of Performance Information Management and develop a performance information management system.	The Chairman can create this position and assign a qualified staff person to lead it, supported by other staff members who have the skills to analyze and present data.	6 months
10	All data processing systems to be completed and utilized throughout CGOSD including MIS, MP-2, inventory, personnel, and financial management.	Properly staff and compensate sufficient positions in Computer and Information Department, as well as in each facility.	Define the skills needed and appropriate compensation to be competitive and get the necessary positions established through CAO.A.	6 months to staff 2 years to complete
11	To have all CGOSD personnel understand that their purpose is to serve the customers and users of the system while protecting public health and the environment.	Redefine the customer service function and focus it at the sector level.	The chairman and all senior managers must stress the customer service function to all staff who deal with the public in any way and assign the responsibility to sector managers.	12 months

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CHAPTER 1 BACKGROUND

History of USAID Investment in Cairo

Since the Camp David Accords in 1979, the U.S. Congress, working through USAID, has invested over \$2.5 billion in urban water and wastewater infrastructure benefiting about 22 million Egyptians with improved water and sanitation services. More than \$1 billion of this assistance was invested in the Greater Cairo area during the past two decades. In addition, both the Egyptian government and other foreign donors have invested in the Greater Cairo wastewater system.

Under a presidential decree, signed on 1 March 1981, a new operational unit of government called the General Organization for Sanitary Drainage Utility – Greater Cairo, was created to be “responsible for the public sewerage and sanitary drainage projects, and sanitary drainage facilities, within its administrative area.” A presidential decree signed on 10 March 1994, stated that “a General Economic Organization is to be established and named the Greater Cairo General Organization for Sanitary Drainage Utility” (CGOSD). This decree amended the earlier decree for the purpose of authorizing CGOSD to conduct its projects on an “economic basis” within the framework of the general policy of the State, in order to realize the balance between its resources and expenditures. This action was intended to enable CGOSD to move toward the implementation of programs that would ultimately make CGOSD a self-sustaining utility requiring no governmental operating subsidies, and to be capable of raising capital for facility upgrading or new projects based on the strength of its own financial performance.

The economic assistance provided by USAID to Greater Cairo for the rehabilitation and expansion of its wastewater system was directed through two programs known as Cairo Sewerage I and Cairo Sewerage II and consisted of the following four key components:

- Engineering studies and technical support to include the design and construction supervision for existing and planned system expansions;
- Construction of sixteen subcomponents to include collection systems, pump stations, treatment plants, and sludge disposal facilities;
- Operations and maintenance training and support to ensure that CGOSD would possess the capacity to operate and maintain the expanded system; and
- Institutional development support to complete the implementation of policy reforms toward institutional autonomy and full recovery of operations and maintenance costs (including emergency rehabilitation); refined budget, capital planning and revenue enhancing methodologies; and improved managerial, organizational and administrative systems.

The economic assistance from the U.S. Congress, as described in the programs undertaken above, is completed at this time. The concern of USAID and the U.S. Congress

is CGOSD's commitment and ability to properly manage, operate and maintain this system, and consequently, to protect the considerable investment made to safeguard the health and welfare of the public.

It is with this stated concern in mind, that this assessment of the current managerial capacity of CGOSD was performed to identify recommendations for institutional sustainability of CGOSD.

Summary Description of Wastewater System Elements

The CGOSD wastewater system is divided by the Nile River, with one operational sector on the west bank of the Nile and three operational sectors on the east bank.

The basic technical information on this system is as follows:

Size of Service Area	921 square kilometers
Population of Service Area:	
Day time	12 – 14 million
Night time	9 – 10 million
Average daily wastewater generated	2.9 million m ³ /day
Collection, Interceptor and Trunk Sewers	7,400 kilometers
Number of Customer Accounts (all classes)	500,000 connections
Water Treatment Facilities:	
Number	6
Treatment Capacity	3.28 million m ³ /day
Current Flow	2.9 million m ³ /day
High Capacity Pumping Stations	30 units
Medium to Low Capacity Pumping Stations	122 units
Support Facilities:	
Fleet Maintenance Facilities	1
Mechanical Cleaning Equipment Workshops	1
Supply/Spare Parts Storage Facilities	43
Dedicated Training Centers	3
Testing/Analytical Laboratories	9

Treatment Plants:

<u>Name</u>	<u>Level of Treatment</u>	<u>Rated Capacity (m³/day)</u>
<i>West Bank</i>		
Abu Rawash	Primary	400,000
Zenien	Primary and Secondary	330,000
<i>East Bank</i>		
Berka	Primary and Secondary	600,000
Gabal el-Asfar	Primary and Secondary	1,000,000
<i>North</i>		
Balaaks	Primary	600,000
<i>South</i>		
Helwan	Primary and Secondary	350,000
Total Rated Treatment Capacity		3,280,000

Sludge Disposal – Western Desert Sludge Drying Site

CHAPTER 2

PURPOSE AND METHODOLOGY

Purpose of the Assessment

This report provides an assessment of the current managerial capacity of the Greater Cairo General Organization for Sanitary Drainage to carry out its intended mandates under the various presidential decrees.

In that regard, it is not an evaluation of what has come before, in terms of technical decisions made relative to the system, its sizing, processes and configuration; nor is it an evaluation focused on pointing out CGOSD's institutional deficiencies. In addition, the assessment does not seek to gain a consensus and commitment of any kind from CGOSD's management to undertake any specific course of action.

The purpose of the assessment, as commissioned by USAID, is to provide an additional tool to CGOSD to use in becoming a purpose-driven, results-oriented economic authority. In that regard, the assessment had the following four stated objectives:

- To provide an impartial assessment of CGOSD's current managerial capacity to properly manage and operate its wastewater system;
- To provide recommendations to CGOSD for institutional sustainability, including potential private sector participation;
- To stimulate a dialogue between CGOSD and the three governorates of Greater Cairo, concerning the utility organization's role and responsibilities in protecting the considerable investment which the public has made in its system, with the purpose of safeguarding the public health and environment; and
- To provide a reference document for potential future donors.

Methodology Used to Conduct the Assessment

The methodology for conducting the assessment was highly interview driven with the intent of penetrating the management, operational procedures and decision making processes at several levels in the organization.

Formation of Assessment Team

Each member of the assessment team was specifically chosen both for his expertise relevant to the nature of the utility and the objectives of the assessment, and because none of them had had any prior involvement with the Cairo wastewater system. In this way, it was felt that the assessment team would bring no historical prejudices in conducting its assessment.

The individual assessment team members, and their primary area of responsibility on the project, were as follows:

- Philip Giantris - Team Leader/Senior Financial Analyst
- Ahmed Allam - Utility O&M Specialist
- Franklin Dryden - Senior Utility O&M Specialist
- Farouk El Sheikh - Institutional Development Specialist
- Mohamed Harfoush - Financial Analyst
- George Kinias - Senior Institutional Development Specialist

Approach to the Interview Process

The approach to the interview process was based on a subtask structure, which focused on elements and activities that are common to the functional conduct of a wastewater utility. In this way, the assessment did not start with what is at CGOSD, but rather asked, how CGOSD performs certain functions that all wastewater utilities must address to achieve their mission. The specific subtask structure used was as follows:

- Subtask 1 – Governance and Organizational Structure
- Subtask 2 – Strategic Planning
- Subtask 3 – Customer Services
- Subtask 4 – Performance Management Systems
- Subtask 5 – Management Support Systems
- Subtask 6 – Financial Viability
- Subtask 7 – Personnel Administration
- Subtask 8 – Human Resources Development and Training
- Subtask 9 - Environmental Compliance Management and Monitoring
- Subtask 10 – Facilities Operation and Process Optimization
- Subtask 11 – Infrastructure Management
- Subtask 12 – Safety
- Subtask 13 – Technical Support Services

As previously stated, the interview process was conducted at several levels of the CGOSD organization to include the Chairman of CGOSD, as well as sector managers, treatment plant managers, maintenance supervisors, finance and personnel specialists, and sub-area emergency response managers, to name a few.

Scheduled Review/Briefing Meetings

To ensure that there was a complete understanding as to the day-to-day activities of the assessment team, and to share observations made in the field for purposes of receiving input on validity and consistency, a weekly review/briefing meeting was held for senior managers of USAID and for the senior liaison of CGOSD for the assessment. The input was taken as advisory only and not a directive to the assessment team.

Weekly meetings were also held among the Chairman of CGOSD, selected staff of CGOSD, and the assessment team. These meetings were conducted to brief the chairman

on observations and initial conclusions, as well as to solicit information on issues that only the chairman could address.

CHAPTER 3

ASSESSMENT OF CURRENT MANAGERIAL CAPACITY

Subtask 1 – Governance and Organizational Structure

Definition and Objectives of the Subtask

Describe the mission and existing governance framework of CGOSD, as a governmental organization dependent on systems and rules developed and administered by central government agencies or the governorates.

Observations and Interview Information

This subtask addresses the governance and organizational structure of the Cairo General Organization for Sanitary Drainage, whose mission it is to safeguard public health through wastewater management services, while conducting its projects on an economic basis as a largely autonomous organization.

Although the issue of governance and organization structure was discussed with various CGOSD managers during the interview process and several reports prepared by consultants have been reviewed, the main source of information for this subtask was provided by the Chairman of CGOSD.

Presidential Decree No. 133, 1981 established CGOSD as a general organization. That decree was amended in 1994 by Presidential Decree No. 95, which authorized CGOSD to become an economic organization and granted it an unprecedented level of autonomy for a governmental agency. Unfortunately, certain existing Government of Egypt (GOE) laws overrule the intent of the amended decree, and therefore have been hindering the process of CGOSD to become an economic and autonomous organization.

Assessment of the Defined Functional Area

Governance. CGOSD is governed by a Board of Directors which, according to Presidential Decree No. 133, “shall be the supreme authority dominating all GOSD affairs, and shall be authorized to issue any decrees necessary to achieve the defined objectives for which GOSD is established.” The Board of Directors consists of 13 members, seven of whom, including the Chairman of the Board, are chosen by the Governor of Cairo.

While the Board of Directors is authorized broad powers within the existing legal framework of GOE, in practice it is not a policy or decision making board. Instead, it is more accurately described as a sounding board for actions, which the chairman is contemplating, and which might be subject to resistance from various review and approval authorities. The Board has been described by senior managers of GOSD, as focused on handling emergency issues only.

The Board approves projects and the capital plan, and it can and does recommend tariff changes. These approvals, however, are part of a long approval process and the Board

does not have the power of final approval on any of these matters. The Board also reviews and comments on the draft budget for the coming year and receives a year-end financial report. The chairman informs the Board of the results of the quarterly audits conducted by the Central Audit Agency. The Board does not act on any personnel appointment or assignment issues. These issues are handled directly by the chairman.

Organizational Structure. Although CGOSD's organizational structure is officially determined by the Central Agency for Organization and Administration (CAOA), attempting to determine the actual operational management structure of CGOSD proved to be less straight forward.

There appears to be a widespread understanding, throughout the CGOSD organization that there are two management structures: the official structure approved by CAO, and the actual one, which the Chairman of CGOSD uses to manage the organization. This unorthodox management practice becomes easier to understand when one realizes the existence of external barriers that prevent the Board and the chairman from making necessary or desirable organizational and personnel changes. To be able to function, they have found creative organizational structuring, which may create some redundancies, but can be accommodated under the existing legal framework.

The chairman described a management structure which mainly consists of a classic line and staff type of organization. The line operation is made up of four sector managers (geographically determined), who are given the authority and responsibility to operate and maintain all elements of the wastewater collection and treatment system that fall within the boundaries of their sector. These four sector managers, along with the managers of finance, personnel, capital projects, legal, and other staff functions, including training, planning, and performance monitoring, report directly to the chairman. The chairman reports to the Governor of Cairo.

Subtask 2 - Strategic Planning

Definition and Objectives of the Subtask

Assess the strategic planning capability of CGOSD, including the presence of a permanent strategic planning staff function. The strategic planning unit, if existent, should be adequately equipped and staffed with personnel capable of developing and updating the CGOSD strategic plan, including coordination of the benchmarking process, monitoring performance targets, and coordination with the management information system.

Observations and Interview Information

The information presented here is the output of interviews with the Chairman of CGOSD, the manager of planning, and the manager of projects. There is a five year capital plan revised and updated annually. The planning is done mainly by the central department of projects, and forwarded to the office of planning, follow-up and performance management, which prepares the official five-year plan and submits it to the Ministry of Planning. The office of planning reports to the chairman and maintains liaison with the appropriate planning departments of the three governorates and the Ministry of Housing and Utilities.

Currently the level of approved funding for capital projects, as contained in the Fourth Five-Year Plan, is LE 532 million for five years and LE 180 million for the current fiscal year (98-99). This funding is mostly in the form of long-term loans financed by the National Investment Bank, and presently only 17% is in the form of grants to the Ministry of Finance from foreign donors.

Assessment of the Defined Functional Area

There is no strategic planning taking place in the traditional meaning of the words. Instead, there is some type of planning occurring in the various departments, mostly in finance and capital improvements. This planning process, however, is done without any central integration of the planning elements in one central planning function, which includes all core functions of the utility.

The financial planning function is merely a budget preparation process, which is done without the benefits of data derived from a cost center system, and without the participation of cost center managers. The only activity that resembles a long-range planning function is that of capital planning, or what are known as BAB 3 expenditures.

Subtask 3 – Customer Services

Definition and Objectives of the Subtask

Assess the customer service function of CGOSD, both as centrally administered, as well as performed in the various service areas. The services could include billing and collection (and customer inquiries related to them), complaints, emergency services, public awareness, and new connections.

One of the most critical components of this service should be the clear and unmistakable understanding by all utility personnel (not only those directly involved with this service) that their main goal is to serve the public, their customers, in the most efficient and courteous manner possible.

Observations and Interview Information

Customer service, as it is traditionally applied to a revenue based utility such as CGOSD, would normally contain the following functional areas:

- Meter reading
- Billing and collection
- New service connections
- Customer inquiries/complaints
- Emergency service response
- Service disconnection
- Public awareness/customer education

CGOSD does not have a functional area called customer service, nor does it have a functional unit that addresses the spectrum of activities listed above. It does, however, conduct some part or all of the above activities in various chapters of the total CGOSD organization.

CGOSD does have a function, which reports directly to the Chairman of CGOSD, called Citizen Services, and which is founded under law to be a required function in all public service organizations. Its function, however, is to react to issues of concern that go directly to the chairman's office in written form, from customers, the media, or from the offices of the various governorates. It also reacts to letters to the chairman from employees within the organization who may have a grievance of some form.

This subtask will address each of the above listed activities and describe how each activity functions within CGOSD.

Meter Reading. Meter reading, which is the driver of the consumption of service in a water based utility, is performed by the General Organization of Greater Cairo Water Supply (GOGCWS). CGOSD does not audit or review the meter reading activities of GOGCWS to determine its effectiveness and accuracy in establishing the level of consumption of service.

Billing and Collection. All sewerage service billing is contained in a combined bill prepared by GOGCWS and sent to each water service customer. In this regard, any customer complaints, with regard to possible billing errors, are handled by GOGCWS. The net result is that any publicly perceived image of customer service by CGOSD in this activity area is that image created by GOGCWS.

New Service Connections. New service connections are managed through the Connections Department of CGOSD, which is a part of the operations and maintenance function. When a potential customer wishes to request a new service connection, he files an application (application form, survey map, building plan with sanitary plumbing plan and an application fee). This is done either at the main CGOSD office for the east bank of the Nile or at one of five area offices on the west bank of the Nile. The system is totally manual at this time.

Once an application has been properly filed, a Connections Department inspector, who is an engineer, visits the site and meets with CGOSD's Area Maintenance Center to understand and review services in the area. Once the site visit has been completed, the Inspector prepares a cost estimate for making the connection. The customer must pay that amount in advance prior to any work being authorized.

For connections less than 100 feet to the connection point on the customer's property, the work order is directed to the Restoration Department of CGOSD, which is a part of the operations and maintenance function. For connections greater than 100 feet, the work order goes to the Projects Department for assignment to the appropriate annual contractor.

At this time, the customer is still responsible to obtain the construction permit from the local governmental authorities to excavate the road, and must coordinate to have the CGOSD crew show-up to do the work.

CGOSD, therefore, has a monopoly over service connections and there is some indication to believe that this work is over priced to the market and substandard in quality, as compared to the services available in the private sector market. Also, having CGOSD employees or CGOSD contractors conducting construction on private property would seem to expose CGOSD to unnecessary liabilities.

Customer Inquiries and Complaints. When a customer has a service problem, which would normally mean that there is a sewage back-up on or in front of a customers property, the customer can call either an area or sub-area office of CGOSD to lodge the complaint. As an example, on the west bank, there are a total of 20 sub-areas. The east bank is divided in to four areas with one of them having four sub-areas.

A customer learns of the number to call of the area or sub-area nearest them from routine television and newspaper announcements of telephone numbers by area.

The complaint is entered into a logbook and the work order for the blockage is issued to a maintenance crew to respond to the complaint. The procedure of reporting the complaints to sector managers and finally to CGOSD headquarters is not clearly defined nor is it necessarily accurate. For example, for the west bank totals by sub-area and area are reported to the emergency response manager at the end of every day, where as on the east bank, this is only done on a monthly basis.

These reports are all manual, although there is a form for submitting them on the west bank but not on the east bank. In neither case is there any means of analysis to assess the frequency and number of complaints from a specific area or sub-area to determine if something could be done in that area to reduce the incidence of blockages. It was reported at the headquarters level that there are approximately 19,000 complaints per month. This number was difficult to verify in the field.

Emergency Service Response. The response to a blockage complaint is made by a maintenance crew, which is given the work order for the complaint. Maintenance crews are on duty 24 hours a day. The crews are generally supplied with manual rodding equipment and respond to the complaint on bicycles. They have no radio contact with the area or sub-area office should they encounter any problems or need senior supervisor or manager advice.

Service Disconnection. The concept of service disconnection is not one that seemed to be part of the enforcement policies of CGOSD. In fact, since CGOSD has no idea of who actually pays or does not pay for service by customer the only enforcement for non-payment would come from GOGCWS as a water termination action.

Public Awareness and Public Education. CGOSD does have a function that it refers to as public relations but which performs many of the tasks that are normally performed under the category of public awareness and public education. This group currently has a staff of five personnel, down from its earlier ten. This was reported to be the result of having to operate on an economic basis.

Aside from the usual media relation activities, it does undertake public education programs concerning illegal connections, disposal into sewers and telephone numbers for emergency

services. Also, as a part of public out-reach, it is involved in programs at schools in coordination with the Ministry of Education, public speaking programs, and facility tours.

Much of the print media public education has been sharply reduced due to budget cuts.

Assessment of the Defined Functional Area

In general, CGOSD has many of the elements of a typical utility in the area of customer service. The assessment did not envision any kind of customer survey to measure customer satisfaction. Therefore, an assessment of the effectiveness of the customer service function can only be made from the various interview inputs from within the CGOSD organization, which were very broad based for this functional area and thereby provided an objective cross-section of views and opinions.

Although moving to a more conventional, unified, customer service organizational structure could be recommended, it is not essential at this time. What is important is that some of the weaknesses of the various functional activities be strengthened, which can be done under the current structure. Specifically, some of these weaknesses includes the following:

- The CGOSD financial management function is not actively integrated with the meter reading, billing, and collection functions of GOGCWS. There is clearly a need to better understand the dynamics of the tariff revenue generation part of the business and to be able to more accurately forecast revenue generation and fluctuations.
- The monopolistic structure of obtaining new sewer connection services only through CGOSD creates a non-market behavior of the cost of this service. This policy will also create the potential for delayed response to demand. Lastly, there is the risk exposure of CGOSD to legal action for possible damages on private property.
- There seems to be a genuine effort, at every level of the organization, to respond promptly and responsibly to customer complaints of sewer blockages and flooding in the streets. The weaknesses here are the need for greatly improved complaint documentation and analysis; improved mobility of maintenance crews; more effective cleaning equipment; and more modern means of communication with crews in the field.
- The insufficient staffing and funding of the public awareness and public education effort within CGOSD results in greater costs in maintenance due to misuse and abuse of the system by the customers.

Subtask 4 - Performance Management System

Definition and Objectives of the Subtask

Assess the performance-management function of CGOSD, including the presence of a staff function, which measures the organizational and facilities performance of the utility based on clear and measurable performance indicators and targets.

Observations and Interview Information

To fulfill its mission, it is necessary for a properly operated and maintained wastewater utility to have all core functions fully integrated, well managed, and performing efficiently.

Facility and organizational performance, in general, is a rational basis of measuring the effectiveness of CGOSD in meeting its mission as a wastewater utility. To that end, many administrative, financial, and technical systems were developed under the Institutional Support Contract (ISC), funded by the U.S. Agency for International Development, to improve the overall performance of the CGOSD organization. Performance management will become increasingly important to CGOSD management as the transition to autonomy and cost recovery progresses.

The ISC contractor developed performance indicators and a monitoring plan to measure the organizational performance of CGOSD. This system was originally initiated by USAID to measure sectoral performance in Egypt against Strategic Objective 6 (SO 6). The ISC project expanded the indicators to include additional items, which are believed to be comprehensive measurement tools of wastewater utility performance. The facility managers submit monthly reports to the Performance and Follow-up Group, which reports directly to the Chairman of CGOSD. It is not clear what action, if any, is taken as result of these reports. It appears that these reports are prepared to fulfill a requirement, but do not seem to be part of a process to which the management is seriously committed.

Assessment of the Defined Functional Area

The concept of performance management is not an alien one to CGOSD. The official organization structure of the utility shows a performance monitoring and follow-up function under the supervision of the manager of central planning. In practice, this group exists under the direction and supervision of the chairman. It seems, however, that this group performs mainly monthly facility inspections, which are also reported directly to the chairman. The group consists of five engineers and is able to inspect each facility once or twice per year, which is a frequency not sufficient to assure performance compliance on a sustainable basis. These inspection reports, which are reviewed by the chairman, and are used to issue directives for corrective action directly to the facility managers.

While there are inspections being performed and performance reports being written, there is no permanent utility wide performance management system in place which measures the organizational and facilities performance and is based on clear and measurable performance indicators.

Subtask 5 – Management Support Systems

Definition and Objectives of the Subtask

Determine the existence and verify the use of management support systems, including, but not limited to:

- Management information systems (MIS)—systems, equipment, and staff;
- Computer technical support—equipment and staff; and
- Communications—systems, procedures, and equipment.

Observations and Interview Information

The management information systems, to include hardware, software, and some amount of training at CGOSD were provided under a USAID-funded host country contract as part of an overall, multi-year Institutional Support Contract. At the time of this assessment, there was little evidence that this technology had found its way into the organization as a management tool, except for some limited use in the personnel management department.

Management Information Systems. On the surface, CGOSD has the framework of a management information system. However, beyond that it is was clear from the interviews in the Computer and Information Department, and from general observations made as to how information gets managed throughout the organization, that the need for MIS and other aspects of computer-based support are not part of the current culture.

At this time, there is a fairly well equipped computer center at CGOSD headquarters, as well as a Central Technical Library and Microfilm Center. In addition to the numerous computers and peripheral equipment distributed throughout CGOSD, there are nearly 70 personal computers, 50 printers and various other peripherals stored at CGOSD headquarters waiting to be distributed throughout the organization. The strategy at this time is for there to be five information centers, with one each at CGOSD headquarters, Helwan, west bank and two on the east bank.

Except for the Computer and Information department, Central Technical Library and Microfilm Center, it was not evident that the developed MIS programs have been taken to completion. In addition, there seemed to be no driving force, among senior managers, to demand that the MIS effort be taken to completion. They have not internalized the need.

For example, elements of an accounting system have been developed, but the Director General of Finance had no idea of what was actually done and functional, since the Ministry of Finance requires hand written reports.

Computer Technical Support. From what was reported during the interviews, the available and capably trained support staff at the Computer and Information Center is very limited and not adequate to do the job of MIS support throughout the entire CGOSD organization. There is also a total absence of computer hardware support personnel. In addition, the director of the center is a consultant who does not work full-time in the position.

It was reported that the wages paid to personnel assigned to the Computer and Information Center are well below those of similar skilled personnel in the private sector. The net result is that individuals stay long enough to acquire adequate skills, and then leave for better paying private sector positions.

Communications. Much of the communication throughout the CGOSD organization, if it exists, is very basic. There is wireless communication amongst senior managers, and an intercom system within the headquarters building.

The various sector manager offices have a land-line phone which serves multiple duties. The various sector emergency response rooms have both a land-line phone to receive complaints, and a radio transmitter to communicate with area and sub-area maintenance locations.

Assessment of the Defined Functional Area

It is important to keep Cairo and CGOSD in perspective when assessing the functional area of management support systems and MIS. It can be a major mistake to demand or expect too much from a system that has been thrust into the age of metropolitan, aerated wastewater management through a major infusion of infrastructure capital.

Capital investment can easily and dramatically change the technology standard of a society, but it does not as easily change the culture of the people who must manage, operate, and maintain that infrastructure. The acquisition and the implementation of a management information system requires a cultural change if it is going to have any lasting effect and be successful.

With regard to CGOSD and its current position relative to MIS, the following specific assessments can be made:

- The senior management of CGOSD, including its chairman, has not made the level of intellectual commitment to moving CGOSD into the information era commensurate with the complexity of the infrastructure investment that has been made.
- The current level of staffing, and the compensation structure for the types of specialists and technicians needed to support the MIS program and its peripheral elements, is inadequate and could result in a failed program.
- CGOSD will require outside expert technical assistance to be able to implement the conversion to a fully integrated management information system.
- CGOSD's current communication systems are inadequate for the geographic size of the system that it manages, and the need that it has to be in contact with its various field based work crews. This is true at every level of the organization from headquarters down to sub-area maintenance office locations.

Subtask 6 - Financial Viability

Definition and Objectives of the Subtask

Assess the financial capability of the utility organization by determining the presence and verifying the use of systems, procedures, and equipment for the development and

implementation of:

- Billing and collection
- Financial analysis and planning
- Financial controls
- Budget and budget preparation
- Tariff process
- Capital improvements and replacement
- Procurement

Observations and Interview Information

The assessment of the financial viability of CGOSD was conducted primarily through a series of interviews with the director of finance and selected Finance Department staff that were brought in to participate and contribute in those interviews.

Billing and Collection. There is no traditional utility billing and collection function within CGOSD. Through an arrangement with the General Organization of Greater Cairo Water Supply, the sewerage services tariff is calculated as a percentage of, and added to, the water tariff. At the time of this assessment, that figure was 20%.

GOGCWS bills its customers every two months. However, GOGCWS makes no regular payments to CGOSD of its 20% add-on to the water tariff. This appears to create serious cash flow problems at CGOSD. After the amount due to CGOSD is calculated, GOGCWS retains 5% of that calculated amount as an administrative or processing fee. At year-end, CGOSD sends an audit/review team to GOGCWS to settle the final accounts and the final amounts due.

The generation of revenues through tariffs for CGOSD is a function of the tariff percentage set and the collections of GOGCWS. The available data indicates that the collection rate from non-governmental customers is approximately 85%, and that from governmental customers is less than 10%.

Financial Analysis and Planning. The financial function within CGOSD, is very much oriented toward accounting, and not financial analysis and planning. Being an all-manual system, it is a major challenge to determine what did happen, and there is no orientation to why and what might happen. Combining this fact with a cost accounting system that only deals with system wide line items (labor, parts, supplies, etc.), rather than cost-center-based accounting, and the capability to conduct any practical financial analysis and planning is nearly non-existent.

To provide for a basis of assessing financial trends in CGOSD, and to experience the effort it would take to begin to perform financial analysis, the assessment team requested to be provided summary financial data on the last three fiscal years showing all revenues and expenses. The manual accounting process used by the department took almost three days to produce the information, and during that time various numbers were revised several times to make the revenues and expenses balance. This summary financial information is provided at the end of this subtask section.

Financial Controls. Financial controls are exercised in a gross way and essentially rest between the director of finance and the chairman. The director of finance prepares a confidential monthly revenue and expense report for the chairman. The chairman's expenditure decisions are based on this report.

Indirect controls do occur, but they are not financially based. For example, a request may go to the manager of stores, who reports to the director of finance, for the purchase of a quantity of a certain, normally stocked, supply item. The manager of stores often will, reduce the amount requested before submitting it to the procurement group, who, in turn, may reduce it again.

Budget and Budget Preparation. This activity is essentially a Finance Department activity with only limited input and participation from senior operational managers. A letter goes out to all division managers requesting their input on necessary expenditures for the coming year. Their only input is with regard to consumables since they do not truly input to staffing from a budget standpoint. They can input to capital, but these are referred to the Planning department for a final decision before they go to the chairman.

It was indicated in the interviews that the target was to move to a cost- center-based budget process for the fiscal year beginning in July of 1999, but it will be manual. It was stated that the Ministry of Finance (MOF) requires all accounting and reports to be manual. However, the general director of Accounts, who is appointed by the MOF and resides at CGOSD, stated that this requirement can be changed if CGOSD proposes to move to a full computerization of their accounts and the chairman makes a request for a reporting change to the Minister of Finance.

Tariff Process. As stated earlier, the sewerage tariff is set at 20% of the water bill for a given two-month period, however it is insufficient to fund all of CGOSD's expenses. As can be seen in the summary financials presented at the end of this subtask chapter, the national subsidy is a major portion of the total income needed to offset the total expenses for the year. This subsidy is growing steadily.

There have been a number of wastewater rate studies conducted with recommendations for a revised schedule of user classes and a proposed steady increase in rates. These rate (tariff) recommendations were designed to achieve financial sustainability and thereby achieve the mandate of the Presidential Decree No.95 for the year 1994. This decree directed CGOSD "to conduct its projects on an economic basis, within the framework of the general policy of the state, in order to realize the balance between its resources and expenditures."

To date, the prime minister, who has the final approval authority over water and wastewater tariffs, has put a stop to local council actions for tariff increases and has maintained the CGOSD tariff at a 20% add-on to the GOGCWS tariff.

Capital Improvements and Replacement. Activities having to do with capital repair (improvement) and replacement are provided for under BAB 3 of the budget. Their need is determined in the Planning Department.

Procurement. As stated previously, the request for a procurement normally results from a need for a supply or spare part that is out-of-stock in stores, and therefore is originated by stores, or is capital in nature, and must go up through the director of planning. Every indication is that this is a fairly subjective process with decisions on need made at a variety of levels, including the chairman's office. Since reductions in the amount requested are apparently common, the requests tend to be inflated so that in the end the true need is never really known.

Assessment of the Defined Functional Area

From every perspective, the financial viability of CGOSD to operate on an economic basis, and the functional ability of the Financial Department to serve the critical management and decision making needs of CGOSD's management, now and into a more complex financial future, must be addressed immediately. In that regard, the following specific assessments can be made:

- CGOSD lacks a financial strategic planning and forecasting capability that is essential to fulfilling its organizational mandate.
- The current manual accounting system can no longer be acceptable in supporting an organization of the size of CGOSD.
- The transition to a cost-center basis of budgeting, accounting, and reporting is essential to support a downward delegation of authority and responsibility.
- The preparation of performance reporting that is designed for use both down and up the organization is essential.
- The stores function, as an operational activity, should not reside in the Financial Department, although it should receive financial oversight in terms of its performance against budget.
- The tariff-based portion of the revenues must be increased to properly reflect the cost of services to the various classes of users.

Subtask 7 – Personnel Administration

Definition and Objectives of the Subtask

Assess the existence and verify the use of personnel systems and programs, including:

- Personnel planning (forecasting the number and types of skills)
- Personnel and compensation systems
- Personnel records system
- Incentives

**GREATER CAIRO GENERAL ORGANIZATION
FOR SANITARY DRAINAGE**

Financial Performance Summary

	Budget			
	Y/E 30 June 1996	Y/E 30 June 1997	Y/E 30 June 1998	Y/E 30 June 1999
INCOME				
Tariff Revenue from GOG/WCS	36,240,825	35,047,522	53,659,033	54,000,000
Tariff Revenue from Qalyobia			36,873	21,300,000
Services for Others		2,263,421	9,160,931	
Connection Charges	6,174,203	3,232,783	7,157,581	
Sludge Sales	283,391	340,920	341,004	
Produce Sales	30,891	54,500	50,063	
Supervision of Connections	591,714	227,908	43,590	
Inspections	149,983	69,237	79,570	
Administrative Mark-up on Invoices	1,604,858	1,571,899	3,498,432	
Penalties Charged to Contractors	284,620	260,932	2,694,542	1,000,000
Other Revenues (1)	19,639,700	70,983,170	13,048,510	6,000,000
Subtotal Revenue Income	65,000,185	114,052,292	89,770,129	82,300,000
National Subsidy	127,638,533	201,100,876	254,594,989	280,243,000
Total Income	192,638,718	315,153,168	344,365,118	362,543,000
EXPENSE				
Employee Salaries	51,275,621	58,618,649	61,438,471	67,856,000
Social Insurance	11,183,332	12,677,845	13,812,495	14,149,000
Other Administrative Costs	8,404,041	6,894,818	10,983,997	7,995,000
Spare Parts/Lubricants/Electricity	39,157,966	43,948,273	38,951,935	52,000,000
Outside Contracted Services	1,680,896	1,535,883	1,135,900	1,600,000
Debt Service	42,205,214	165,819,482	184,100,651	218,744,000
Other Current Costs	38,731,648	25,658,217	33,941,671	199,000
Total Expense	192,638,718	315,153,167	344,365,120	362,543,000
Net National Subsidy to CGOSD	85,433,319	35,281,394	70,494,338	61,499,000
Tariff Revenue as % of O&M Expense	24.1%	23.5%	33.5%	37.6%
Revenue Income as % of O&M Expense	43.2%	76.4%	56.0%	57.2%

(1) Increased revenues due to large meter installation program at GOGCWS.

(2) Abnormally high other revenues due to taking unclaimed deposits to the operating statement as one time event.

Observations and Interview Information

The assessment of the personnel administration functional area was based on an interview conducted with headquarters staff, in a group meeting, with the department general director present. The following reflects the observations and information gathered under the various topic areas listed above:

Personnel Planning. Personnel planning is not an independent action that CGOSD can exercise in the management of its operations. It is strongly influenced by, and must work in close cooperation with, the Egyptian Central Agency for Organization and Administration. The CAO must approve all positions in an organization to include the job description, the required qualifications, the title, and the salary range.

Personnel Administration sends a letter to senior managers of CGOSD annually informing them of their approved positions and asking them for their requests for more or new positions. CGOSD's Personnel Management Department can move position slots around the organization, with the chairman's approval, but CGOSD cannot change the title, job description, qualifications, or salary range of that slot.

CGOSD presently has 16,625 approved positions and approximately 14,700 full time employees. It was stated that this probably represents a surplus of 10-30%. However, it was also stated that there is a shortage of personnel in the laborer categories (non-skilled), due to the low salaries and the nature of the work (climbing down into sewer manholes to remove debris from blockages). In addition, there is a lack of critical skills in a number of areas such as financial planning and analysis, computer systems, legal, instrumentation, and controls technicians.

Personnel and Compensation Systems. As stated above, the base compensation of the employees of CGOSD is determined by CAO with no input from CGOSD. Salary increases are a combination of nationally mandated increases, as well as merit or performance based increases. However, the total increases must fit within the salary range for the position as set by CAO.

The procedures for personnel promotions or appointments within CGOSD are defined by national regulations. From the general director positions and up through the chairman, the appointment or selection is on ability, and the individual can come from inside or outside CGOSD.

For promotions in the middle manager position of first grade, 50% can be made on ability, but 50% must be based on seniority. For promotions in the middle manager position of second grade, 25% can be made on ability, but 75% must be based on seniority. For all positions below middle manager, the promotion is based totally on seniority.

Recommendations for promotion must go to a personnel committee composed of representatives of various departments. The personnel committee recommendations then go to the chairman for approval.

Personnel Records System. Of all of the departments of CGOSD, personnel management has seemed to have moved furthest in working with CGOSD's MIS group to

apply the computer systems and software in their operations. At the time of the interview, they had entered over 11,000 employee records into the computer system, and were fast approaching the point where they could generate a payroll, based on those records, from the computer.

The records on each employee are quite comprehensive and they allow personnel management to analyze CGOSD's employees along a number of data fields, such as a work force aging analysis.

Although personnel management is progressing in this way, they are limited by the rules of the Ministry of Finance for manually prepared data and payroll checks, which it must sign before they can be issued.

Incentives. Incentives, in the form of bonuses, can be issued within CGOSD. Individual managers can make recommendations monthly of personnel that have done especially good work. The manager has a budget for the year, but the monthly recommendation requires the approval of the chairman.

Assessment of the Defined Functional Area

Given the limited scope of the personnel management functional area, because of the external role of the CAO, it appears to be fulfilling its organizational mandate. The assessment did not envision interviews with personnel at all levels of the CGOSD organization to conduct some form of employee satisfaction survey, nor were they conducted.

The initiative to implement computer based record keeping was commendable in light of the lack of progress of implementing the MIS services in other areas of CGOSD.

Subtask 8 - Human Resources Development And Training

Definition and Objectives of the Subtask

Assess the managerial capacity of the utility in having the appropriate procedures, staff, equipment, and facilities to:

- Identify training and development needs by assessing the utility's strategic needs versus actual performance;
- Develop training action plans and performance improvement programs, based on feedback from the performance management unit;
- Design, develop, and deliver training programs to improve the skills, knowledge, and attitude of the personnel;
- Measure training effectiveness against specific unit and individual performance targets; and

- Provide professional development and technology transfer opportunities to all employees.

Observations and Interview Information

There are three training centers designed to meet the training needs of the utility. The main one is located within the grounds of the Zenein treatment facility and was built and equipped by USAID funds. It consists of several expandable classrooms, instrumentation and control workshops, laboratory, computer training room, library, offices, and media development room. It is equipped with a kitchen and cafeteria for the use of the staff and trainees. By any standards, this is a world class facility that would be adequate to meet the training needs of all of the CGOSD staff. In fact, there should not be a need for another training facility were it not for the long distance that the CGOSD employees from the other sectors would have to travel to attend training programs.

Assessment of the Defined Functional Area

Although the physical condition of the training center has deteriorated significantly from its initial state, it is the best part of the overall training capacity of the organization. A visit to the Zenein training center and an interview with the CGOSD training manager revealed that the training capacity of the organization is essentially not functioning. The classrooms showed no signs of recent training activities. The poor condition of the building, furniture, and equipment indicated a lack of proper maintenance.

There appeared to be no master training plan nor any training schedules, training plans, or training needs being assessed. The only training planning that seemed to be taking place was a brochure (under preparation) which promoted the training capabilities of the center to potential, external, non-CGOSD customers for a fee.

A great deal of training has been provided to a large number of CGOSD employees during the past fifteen years under various foreign donor contracts. An equal number of training materials have been developed and are available in the training centers.

Subtask 9 - Environmental Compliance Management and Monitoring

Definition and Objectives of the Subtask

Determine the existence and verify the use of environmental compliance management and monitoring systems, procedures, facilities, equipment and staff in the following areas:

- Treatment plant effluent monitoring
- Industrial waste management
- Laboratory capacity—equipment, staff, QA/QC, sample collection/preservation
- Risk management
- Environmental laws and regulations

Observations and Interview Information

Effluent Monitoring. Based on interviews with laboratory and treatment plant personnel, there appear to be environmental compliance monitoring and management systems in place and functioning within CGOSD. Effluent standards for biochemical oxygen demand (BOD), total suspended solids (TSS), and coliform limits are established under Egyptian Law No. 48, which regulates discharges of both treated wastewater from public wastewater treatment plants (WWTPs) and treated industrial wastewater to Egyptian waterways. Direct discharges of treated municipal wastewater to the Nile or its tributaries is prohibited. Discharges of treated municipal wastewater to drains must meet a BOD limit of 60 mg/L and TSS limit of 50 mg/L.

Samples are collected daily at WWTPs and analyzed for BOD and TSS. The central laboratory personnel also collect effluent samples once a week from the WWTPs and compare their data with the monthly summary reports they receive from the WWTPs. The reports are not routinely sent to higher levels of management or to any outside regulatory agencies, although data is furnished upon request.

There appears to be minimal regulatory concern outside of CGOSD regarding effluent compliance. There are no site-specific permits or requirements. The Ministry of Health samples plant effluent once per month, but is primarily concerned that coliform levels do not exceed the most probable number (MPN) limit of 5,000 per 100 ml. This level is not hard to reach with chlorinated secondary effluent, which typically runs around 300 MPN/100mL at Zenein. However, it is impossible to meet with primary effluent, and no enforcement action has been taken because it is recognized that the coliform requirements and a BOD of less than 60 cannot be obtained with primary treatment alone. Even the secondary effluents are not always chlorinated because of failure of the chlorination equipment, as at Berka WWTP, or decisions to not chlorinate at all times of the day because of cost, safety, or other factors.

Industrial Wastes. Industrial wastewater discharges to the CGOSD WWTPs are regulated by the limits contained in Law No. 93, which was issued in 1962 to protect the Nile and other water bodies from excessive industrial wastewater discharges. Some of the constituents and limits are inappropriate for industrial discharges to wastewater treatment plants and a committee has been formed to make them more reasonable. At present, many industries exceed the low BOD and TSS limits contained in the law, but no action is taken against them because everyone agrees that the limits are inappropriate. There is an apparent consensus that there should be different limits set for industries discharging to sewerage systems versus those discharging directly into natural water bodies.

The Industrial Waste Department (IWD) was established three years ago. There are 5,000 industries in the system including workshops, restaurants, and service stations. Not all are under permit as yet. IWD offers technical assistance to help industries put in appropriate pretreatment, as well as in conducting inspections, taking samples and enforcing requirements. The IWD currently has six engineers, four technicians, three chemists, four drivers and three administrative staff. There is a service charge system in place and it is included in the permits. For industrial discharges that exceed the average BOD (223 mg/L) and TSS (339 mg/L) concentrations of the wastewater system, the charge is LE 0.36/kg for BOD and LE 0.12 /kg TSS. Charges are collected on water bills so samples are collected every two months to provide the basis for the billings. Flows are based on 60% of the water

supply unless the industry installs a wastewater flow meter. If an industry relies on its own groundwater wells, they must install a flow meter for their wastewater flow. The LE 1 million collected from industries last year went directly to the Ministry of Finance and does not support CGOSD directly.

Data on industries is currently stored in notebooks as the department only has one computer and no data base or report preparation programs to allow electronic record keeping. The IWD has three vans, which were furnished by ISC.

Laboratories. There are nine laboratories: one at each of the six treatment plants and three central labs. There are normally 33 graduate chemists and ten technicians in the laboratory group. The assessment team had no opportunity to assess the quality of the staff, although the chemist interviewed appeared knowledgeable. Laboratory personnel at the six plants collect influent and effluent samples daily and the central lab collects similar samples once per week. Quality control is achieved by comparing the central lab results with the daily data from the plant labs, which are sent to the central labs once a month. Sometimes there are split samples run, but it is not clear what action is taken if they produce different results. There are computers in the central labs to log and manipulate data, but there is no network linkage or electronic communication of data between labs. Data are transmitted between labs as report printouts. The labs are relatively new and generally well equipped, but maintenance and repair of equipment is a significant problem which will get worse with time. The cost of such maintenance and repair needs to be included in future budgets.

There is a concern that laboratories may have difficulty maintaining an adequate supply of chemicals for use in routine analyses. In the past, laboratory chemicals on the west bank were supplied under USAID contracts. However, that support has stopped. The current budget includes LE 150,000 for laboratory chemicals or supplies. This should be sufficient for their needs, but if a lab runs out of something critical, it can be purchased on an emergency basis if the cost is less than LE 1,500 and the chairman approves the request. Even if the budget is revised to include laboratory chemicals, it was reported that the requisition process is considered to be so slow, arbitrary, and cumbersome that it could lead to problems keeping adequate stocks to perform analyses when they are required.

Risk Management. There was no evidence of any formalized approach to managing potential risks. There was some appreciation of potential safety risks within the plants and the safety program, particularly for confined spaces. But there was no group identified that was concerned with long range planning to reduce risks of effluent discharge violations, environmental pollution incidents (bypasses to waterways), or hazards from chlorine or digester gas.

Environmental Laws and Regulations. Existing environmental laws and regulations appear to be minimal. Law Number 93, which was issued in 1962, regulates industrial discharges into the collection system. Its limits on BOD and TSS are too low, thereby causing unnecessary pretreatment by industries. However, its limits on other constituents are generally too high to protect the WWTPs from toxic impacts at secondary treatment plants or to make the sludge useable in agriculture. Law No. 48 controls effluent discharges to natural water bodies, but it does not distinguish between limits that would be applicable to secondary treatment plants versus primary treatment plants. There is only one standard for

all plants. However, direct wastewater discharges to the Nile are prohibited, regardless of the level of treatment provided. Coliform limits are relatively high with respect to protecting public health (5,000 MPN/100 mL), but lower than can be accomplished with primary treatment or with secondary treatment without chlorination. A national committee has been formed to reconsider the limits in both laws, but it is too early to know how the laws may be modified. Compliance with environmental laws by CGOSD is largely in the hands of the WWTP managers and the Director of Laboratories.

Assessment of the Defined Functional Area

The construction of a significant collection system and treatment facilities over the past 20 years has certainly had a beneficial impact on the levels of pollution in the Nile and other Egyptian waterways. However, the following assessment statements can be made:

- The laws which regulate discharge of municipal and industrial wastewater appear to be disjointed, overlapping, and out of date.
- There is no clear responsibility for outside monitoring of CGOSD's performance and no clear enforcement mechanisms for failure to comply. Indeed, there is a general recognition that the current laws cannot be complied with because they are frequently inappropriate and do not recognize the level of infrastructure available at this time.
- Faced with this situation, CGOSD's WWTP and laboratory personnel attempt to operate and monitor the performance of the plants within the limits of their facilities and skills.
- The Ministries of Health, Environment, and Housing, Utilities and New Communities all have some role to play in the regulation of environmental impacts, but there needs to be a more coordinated, technically defensible approach to protecting the environment.

Subtask 10 - Facilities Operation and Process Optimization

Definition and Objectives of the Subtask

Assess the managerial capacity of CGOSD to properly and cost-effectively operate the collection system, treatment plants, and sludge disposal facilities. In addition to assessing the operations, determine the existence and verify the use of process control and optimization methods and procedures, including monitoring and calibration equipment and staff. The procedures for and authorized amounts of small-value procurement should be examined as well.

Observations and Interview Information

After several requests, CGOSD was unable to produce maps showing the collection system, pumping stations, and treatment facilities in detail, although a schematic showing the major facilities was provided. A list of major facility characteristics is included in the background chapter.

Collection System. The responsibility for cleaning the collection system is divided by size of sewer. Sewers larger than 24 inches in diameter are cleaned by the Mechanical Cleaning Department for all of CGOSD. Sewers smaller than 24 inches in diameter are cleaned by crews in each sector. Smaller sewers are generally of vitrified clay pipe and larger sewers are of reinforced concrete pipe. There are some corrosion problems being experienced with the concrete pipe.

The Mechanical Cleaning Department has 600 employees, 52 bucket cleaning machines, and 5 jet cleaners, along with associated rodding machines and trucks, to maintain about 400 km of large sewers. A typical bucket cleaning crew has 13 members.

Data on sewers and manholes are contained on computer printed maps with the lines drawn in by hand. The manholes are not numbered or otherwise uniquely identified. Most of the sewers constructed by CGOSD are of proper size and slope, and perform well. However, some of the older lines are relatively flat, and they accumulate sand and grit. Other areas include sewers constructed by builders without benefit of design standards. Lines may have reverse slopes or may be improperly sized or laid, but CGOSD must clean them after the new area is annexed into the system. In the west bank, cleaning schedules were presented for the small sewers, which showed weekly assignments. The west bank sector is equipped with four jet cleaners and four catch basin cleaning machines. There are 20 sewer maintenance centers, each with a truck, for cleaning the local sewers. The jet cleaners are sent to the locations with the greatest need for them.

Bucket machines are set up between two manholes, and a cable with a bucket attached is run through the sewer. The bucket is dragged from one manhole to the other and then withdrawn and dumped in a dump truck. They are capable of removing three to four m³/day of grit. There are some lines where they set up and operate for five or six months at the same location. Assuming a 1.6 meter diameter line extending 100 meters between manholes, the volume of the line is about 200 m³. Therefore, the entire volume of the line could be removed in less than 70 days. It appears that grit must be accumulating in these lines at about the same rate it is being removed by the bucket machines.

CGOSD was furnished 24 new bucket machines from England, but the Mechanical Cleaning Department was not consulted about the design of the machines or CGOSD's equipment specifications. The machines did not work in Cairo's manholes and are now sitting in stores. In order to keep up with the accumulations of grit, CGOSD could use additional cleaning machines—both jet cleaners and buckets. The jet cleaners are effective in the smaller lines.

Wastewater Treatment Plants. The following wastewater treatment facilities currently exist:

CGOSD Wastewater Treatment Facilities (October 1998)

Plant Name	Level of Treatment	Treatment Capacity (m³/day)	Current Flow (m³/day)
Zenein	Secondary	330,000	330,000
Abu Rawash	Primary	400,000	430,000
Helwan	Secondary	350,000	280,000
Berka	Secondary	600,000	500,000
Balakas	Primary	600,000	450,000
Gabal el Asfar	Secondary	1,000,000	500,000
Total		3,280,000	2,490,000

The team was advised that the total wastewater collection system flow is currently 2.9 million m³/day. Since the total measured flow into all of the WWTPs is only 2.49 million m³/day, there appears to be over 400,000 m³/day of wastewater that does not receive treatment.

The flows are projected to total 3.8 million m³/day by the year 2002. The current total treatment capacity is slightly less than 3.3 million m³/day, so there will need to be an additional 500,000 m³/day of capacity constructed during the next three, if all raw wastewater is to be treated before it is discharged to the nation's waterways. Neither the sector managers nor WWTP managers appeared to be aware of any plans to expand the treatment capacity of the system to be able to handle these projected flows.

However, the chairman advised that there were plans to spend 200 million Egyptian pounds per year through the year 2002 in order to provide the required capacity. There are plans to double the size of the Helwan WWTP so that it can treat 700,000 m³/day, expand Gabal el Asfar WWTP to 1.5 million m³/day or 1.8 million m³/day, and provide for ferric chloride addition to Abu Rawash's WWTP influent to assure that it can operate at an average flow of 600,000 m³/day. There are also plans to add secondary treatment to Abu Rawash. If these goals are realized, there will be sufficient capacity in the system to give all wastewater at least primary treatment and most will receive secondary treatment by the year 2002. However, at the present time, there seems to be about 440,000 m³/day that does not receive treatment.

The assessment team visited two secondary treatment plants (Zenein and Berka) and one primary treatment plant (Abu Rawash). Both Zenein and Berka were operating satisfactorily with BOD and TSS in the effluent between 10 and 20 mg/L. However, the chlorination system at Berka was not operational because the equipment was very old when installed and needs repair. The Zenein WWTP effluent is reported to have coliform levels in the 300 MPN per 100 mL range, but the plant only runs the chlorination system during the day time shift (8 hours per day), and the chlorine residual on that shift is only 0.5 mg/L.

The plant operators did not seem to have any concepts of operational control of their activated sludge process. Apparently, the systems are adequately over designed so that there is not a great deal of operational control required. Sludge is wasted at a rate that maintains mixed liquor suspended solids (MLSS) in the range of 1,500 to 2,000 mg/L and the return activated sludge (RAS) is at about twice the MLSS concentration (i.e. a return sludge rate equal to the plant flow). Under these conditions, the plant effluent appears to be satisfactory.

Although there is a great concern throughout CGOSD to reduce costs, it is not clear that the plants are now, or can in the future be, operated in the most cost-effective manner. That is because the plant managers cannot obtain the equipment or materials they need to improve plant operations without great delay and effort. Cost-effectiveness should mean operating at the lowest unit cost achievable while maintaining compliance with discharge requirements. Some of the cost savings (not using chlorine, bypassing raw sewage) result in the violation of requirements.

The Abu Rawash primary plant is bypassing flows that are in excess of its design capacity of 400,000 m³/day and sending them directly to the drainage channel. During the field observations, this excess flow rate was approximately 30,000 m³/day. The plant is situated in such a way, that all of the effluent must be lifted out of the plant by effluent pumps. Although there are eight effluent pumps, two are not operational and one is experiencing excessive vibration problems. Each has a capacity of about 100,000 m³/day, so four pumps are able to handle the average flow. However, if a pump fails, the flow can start backing up through the sedimentation tanks and overflow the inlet channel for the tanks. This has happened in the past, so the plant manager is reluctant to operate above his average design capacity, even though the peak capacity is 50% greater than design or 600,000 m³/day.

Within a few months, there will be an additional wastewater flow of 50,000 to 150,000 m³/day coming into the plant. Unless the effluent pumps are repaired or additional standby pumps installed, all of the additional flow from the new territories will also be bypassed. Currently, one of the four grit chambers was out of service because the lower bearing on the grit removal screw had failed several months ago and is awaiting repair. There is also a tender being prepared to balance the shafts and impellers on the eight effluent pumps; the work will require several months to complete.

Sludge Disposal. On the west bank, primary and secondary sludge from the Zenein plant is pumped to Abu Rawash at 5% solids, where it is supposed to be thickened in thickeners and then pumped with Abu Rawash primary sludge 34 km to 600 hectares of sludge drying lagoons in the western desert. The sludge thickeners have not been effective and Zenein sludge has been diverted to an emergency storage lagoon near the Abu Rawash plant. This lagoon is reported to be full and overflowing to the drain. This is a serious operational problem that has not been solved, although the plant manager has experimented with adding dissolved oxygen and spraying primary effluent on the thickeners in an effort to enhance their performance. Neither approach has helped. Historically, the condition was improved when Zenein sludge handling operations were modified to reduce sludge age and storage time.

The sludge lagoons in the western desert appeared to have surplus capacity. The sand allows much of the liquid in the sludge to seep into the ground quickly, and GOSD operators do not replenish the water as per prescribed lagoon operating procedures, thereby inhibiting anaerobic digestion in the lagoons. None of the sludge has yet been removed from the beds. It is assumed that eventually it will be sold because it is prized as a soil conditioner by developers in the area and is reported to be worth about LE 8 per m³.

It is understood that raw sludge drying beds are used at three of the east bank plants and that the new plant, Gabel el Asfar, has both anaerobic digesters and belt press thickeners for handling sludge.

Small Value Procurement. From a management standpoint, the procurement of small items costing more than LE 50 requires far more labor and time than appears justified by the value of the expenditures. The sector managers signature is only sufficient for purchases of any item costing less than LE 50. Facility managers have no authority to make purchases. All purchases costing more than LE 50 must be sent to the chairman for approval and purchases costing over LE 100,000 must be reviewed by a committee that makes recommendations to the chairman, who may either follow or veto the recommendations.

The exception to this tightly controlled spending procedure is emergency situations, when the sector manager is authorized to solve the problem immediately, notify the chairman by phone, and follow up with the paper work later. In some cases, it is more efficient to allow stocks to expire, so that they can be purchased on an emergency basis when needed. This avoids having to try to stock up in advance with a high prospect that the request will be drastically cut or refused by either the director of stores or the chairman.

Although petty cash is limited to LE 500, it can be replenished as soon as it is exhausted. However, facility managers do not have or control petty cash accounts. Even acquisition of an item from stores requires filling out a request form which must be sent to the director of stores for his signature and stamp and be returned to the store, before the item can be released, regardless of the urgency of the situation.

Significant Problems. Various interviews in the west bank sector cited the following items as major concerns and some were repeated in various forms by other major activity managers:

- He would like to have his stores under his direction so that approvals are not subject to the whims of others who have no responsibility for his operations.
- He needs more cars and trucks to accomplish sewer maintenance effectively. However, he has established a vehicle maintenance center on the west bank, which helps with timely repairs.
- There is a perpetual problem of rubbish and debris being placed over manholes and inhibiting the ability of crews to clean and maintain the sewers. In addition, some of the manholes are in streets so narrow that trucks and equipment cannot reach them.

- Manhole covers made of ductile iron are lighter than those made of cast iron and are easily removed or stolen, thereby allowing debris to be dumped into and clog sewers.

Chain of Command. The table of organization includes a position for the head of operations and maintenance sector. He indicated that he reviewed operations and approved requests, but no one below him on the organization chart indicated that he reported to him. They all said they reported directly to the chairman. It appears that the actual command procedure is directly from the chairman to the facility managers, rather than as shown on the table of organization.

Assessment of the Defined Functional Area

The major managerial problem appears to be that sector managers and key managers of treatment plants, pumping stations, and collection systems have a great deal of responsibility but insufficient authority to accomplish their tasks. They have limited powers to transfer or hire people, and no power to terminate incompetent staff.

They are not able to implement needed changes in their facilities or operations without extensive delays while proposals are reviewed, and often arbitrarily denied or changed, by others who do not have operational responsibilities.

They cannot purchase needed parts or equipment in a timely manner, even when the items are already included in their general budget. In spite of these limitations, top managers are generally dedicated to achieving pollution control with their facilities and are creative in finding ways to work around the system to achieve those ends.

Subtask 11 - Infrastructure Management

Definition and Objectives of the Subtask

Determine the existence and verify the use of a total infrastructure management system designed to assure that all the components of the infrastructure are properly maintained in a continuous and reliable manner. This component of the assessment shall address the following:

- Inventory control system
- Preventive and corrective maintenance program
- Maintenance support and warehousing facilities
- Mapping and infrastructure inventory
- Active service contracts

Observations and Interview Information

Inventory Control. Many managers expressed concern over the unavailability of spare parts and the inadequacy of the stock inventory system. Spare parts appear to include routine expendable items such as soap or laboratory chemicals. There are 41 stores, which are locations where a storekeeper is responsible for stocking supplies and parts. However,

there is no effective parts control system, because there is no uniform coding system for all of the stores, and no integrated database to allow a determination of whether an item missing from one store is available at another. Managers who need critical parts send people around to various stores to look for them.

The MP-2 maintenance program includes an inventory system, and work was begun on coding parts for the vehicle maintenance store prior to the conclusion of the ISC program. However, a great deal remains to be done, and manual systems are currently in use in all stores. There may also be a cultural resistance problem to overcome before a new system will be accepted and used. It was estimated by several managers that the effort to computerize, standardize, and integrate the CGOSD system of parts storage will require several years of focused effort and additional technical and financial support from outside.

Preventive, Predictive and Corrective Maintenance. Most managers recognized the importance of preventive and predictive maintenance programs and had the beginning elements of the MP-2 maintenance program on their computers. However, the average estimate was that the system was no more than 20% functional. Problems cited by these managers included the need for additional data entry on equipment, the lack of a parts coding system that was compatible with stores, the need to translate the English versions into Arabic for their workers, and the reliance on manufacturer supplied maintenance procedures, obviating the need for maintenance instructions on the work orders.

Corrective maintenance is tended to on an as required basis, since it is based on something failing due to inadequate preventive maintenance or unusual conditions.

Maintenance Support and Warehousing Facilities. Each WWTP and major pumping station has its own store which is supposed to stock the critical parts needed for the specialized equipment in that facility. The Mechanical Cleaning and Vehicle Maintenance Departments also have their own stores. However, retrieving materials from stores is slow and cumbersome because it requires sending a requisition to the stores department manager for his approval, signature and stamp, before the item can be released. The store inventory system does not include restocking when previously established minimum quantities are reached and the last of an item can be used without notification of anyone. Thus when that item is needed again, the facility manager must initiate a purchase procedure instead of just getting it from his store. Stores are under the direction of a Storekeeper, with or without an assistant. If the storekeeper is absent, it may be impossible to obtain needed parts because no one else has a key or the authority to release parts.

Mapping and Infrastructure Inventory The inability of the team to obtain a complete map of the collection system showing the locations of all pumping stations and treatment facilities, would indicate that infrastructure mapping may be deficient. The Manager of the Mechanical Cleaning Department had maps showing where the sewers that he is responsible for are located but confirmed that there is no numbering system for manholes or an adequate data base describing their characteristics and locations.

Limited computerization of maps was begun during the ISC program but the portion of the system that has been computerized is reported to be less than 20%. It was estimated that providing a functional computerized mapping program for the whole system would require at least two years of concentrated effort with adequate outside technical and financial support.

Active Service Contracts. There are a limited number of specialized services provided under outside service contracts and these tend to in non-core business activities such as, maintenance of air conditioners, phones, and copiers at the Zenein WWTP.

Assessment of the Defined Functional Area

Most operational units of CGOSD have the MP-2 maintenance management program on their computers, but they are estimated to be at about 20% of their potential. Different facilities vary in the degree to which the program is used for scheduling maintenance of equipment. The program is used to generate work orders for preventive maintenance of equipment, but the work orders generally only identify the equipment and the type of service it is to receive (weekly, monthly, quarterly, or yearly). They do not identify assigned staff or the required parts, nor do they instruct the maintenance staff on applicable procedures or precautions. The staff is expected to use the maintenance manuals furnished by the manufacturer.

Often the work orders are not actually given to the staff performing the work, because they are printed in English, which the workers cannot read. CGOSD apparently does not have a language conversion program available such as that used at GOGCWS. There is a desire to make the system fully functional, but the general estimate is that it will take several years and substantial funding and outside expertise to complete the system. A key missing element is a standardized parts coding system for all of CGOSD.

Subtask 12 - Safety

Definition and Objectives of the Subtask

Assess the managerial capacity of CGOSD regarding the existence and use of safety programs, equipment and staff, including:

- Safety practices manual
- Personal protective equipment
- Accident prevention awareness program
- Safety audits

Observations and Interview Information

Safety Practices Manual. A safety procedures manual was produced by a consultant, translated into Arabic, and distributed to the treatment plants. However, the manuals have apparently disappeared and are no longer available in the plants.

Personal Protective Equipment. Personal protective equipment, such as self-contained breathing apparatus at chlorine stations, has been supplied to treatment facilities. However, there is a problem with potential theft of portable equipment, and the plant manager is held financially responsible for any loss of equipment. Therefore, plant managers lock up safety equipment so that it is not available in the locations where it would be needed in an

emergency. To the extent that this is true, it is a major failure in the safety program, caused by a CGOSD management policy.

The safety consultant recommended using gas sniffers to test the atmosphere in confined spaces before entry. However, the recommended equipment required replacement of expensive sensors and calibration monthly, so the equipment is no longer used (because of the cost). However, the safety officer is very concerned about confined spaces and simply instructs personnel to treat every confined space as if it contained hazardous conditions that required proper ventilation. This is an appropriate and safe procedure to follow.

Accident Prevention Awareness Program. The safety officer has two engineers and five technicians on his staff. He indicates that some 200 people have been trained in safety awareness and distributed among all of the treatment and pumping facilities to provide on site training to plant personnel on a regular basis.

The major safety problem may be related to personal hygiene—a concept that is not understood by many of the workers. Consequently, there is reported to be a high incidence of wastewater transmitted diseases among treatment plant workers. The west bank sector manager reported that they now provide vaccination of government workers for hepatitis and tetanus.

There is a competition between the plants for the best plant of the year and safety counts for 20% of the total points in the evaluation. This is intended to encourage good safety programs and practices in the plants. However, it may provide an incentive to under report accidents. Small accidents (cut fingers, accidental falls, etc.) are not reported. The safety officer believes there were 200 to 250 unreported accidents last year. There have been 35 accidents reported over the past three years. However, none of the plant operators at the WWTPs visited by the assessment team indicated that they had any on-site accidents in the past year or two. Considering the types of equipment used, one would expect to see a normal accident rate frequency for wastewater treatment plants, which is when it is usually well above zero.

Safety Audits. The safety officer and staff make plant inspections and recommend changes where appropriate. The safety audit reports are sent to the chairman. The safety officer does not have the authority to have unsafe conditions corrected, but can request that the chairman direct that appropriate steps be taken by facility managers. The safety officer is not consulted at the design stage of new projects. Therefore, some facilities are built with safety hazards that are not easily corrected after they are constructed. For example, the new chlorine installation at Berka contains very old equipment originally purchased in 1984. The plant does not have appropriate tools for repair of the system if a leak were to occur. Furthermore, the ventilation system is not designed properly to vent chlorine leaks away from workers.

Reports of accidents come to the safety officer for review. Small accidents are not reported to anyone else, but the safety officer advises the chairman about large accidents that may involve reporting to the police or an insurance group.

Assessment of the Defined Functional Area

There is a management structure to deal with safety issues, but the safety officer does not seem to have sufficient authority to achieve prompt corrective action when needed. Plant managers are aware of safety issues in general, but their efforts seem limited to the most obvious problems such as confined spaces and chlorine.

The condition of equipment, the absence of handrails in some locations, the deterioration of tread plates on stairs, and the piles of debris and similar conditions would indicate that there is room for improvement in the safety program.

The treatment plant managers interviewed generally reported that there were no in-plant accidents during the past year. Considering the number of workers at the CGOSD facilities and the accident history of other wastewater agencies, the assessment team is of the opinion that accident reporting may be well below the accident rate and that actual accident rates may even exceed the safety officer's estimate of 250 per year.

Subtask 13 - Technical Services

Definition and Objectives of the Subtask

Assess the existence and verify the use of technical services in support of operations, maintenance, construction, and laboratory, including:

- Calibration of equipment
- Corrosion control
- Rehabilitation/capital improvements
- Electrical engineering—including instrumentation and control
- Mechanical engineering
- Civil and structural engineering
- Environmental engineering

Observations and Interview Information

The primary technical support available within CGOSD resides in the Central Department of Projects in the sense that it is described above. This capability is limited mostly to civil and mechanical engineering and, to a lesser degree, electrical engineering. The emphasis of the department, however, is clearly in the area of rehabilitation and capital improvements. This seems to be consistent with the overall emphasis of the organization in capital projects.

Some reported current history on the success of capital improvement projects within the Execution Department of Capital Projects shows that a pumping station and a small treatment plant are still not complete, long after the scheduled completion date, due to the department's inability to meet schedule.

Assessment of the Defined Functional Area

The capacity of the utility in technical services directed to the operational function of the organization, as mentioned above, is limited. This is mostly not because of lack of expertise or adequate number of staff, but rather because the CGOSD sees itself more as a provider of engineering consulting services to external customers, rather than as a provider of technical support services to its internal customers.

Operating utilities like CGOSD normally do not engage in capital projects with their own work force. They prefer to bid that work out to the private sector contractor market, where they can get competitive pricing and contractual guarantees on timely completion.

Deficiencies exist, however, in technical capabilities (personnel and equipment) as well. Corrosion control, equipment calibration, instrumentation and control, and environmental engineering are areas which could benefit from additional specialized personnel, appropriate equipment, and facilities.

CHAPTER 4

RECOMMENDATIONS FOR INSTITUTIONAL SUSTAINABILITY

The preceding chapter addressed the individual subtasks, as contained in the terms of reference, for undertaking this assessment. Specifically, it presented the observations and interview information gathered by the assessment team, as well as an assessment of the functional area as defined in the terms of reference.

This chapter uses the information and assessments presented previously as the basis for achieving an integrated set of recommendations to achieve the institutional sustainability of CGOSD. In that regard, this chapter is organized around the key functional areas of a successful wastewater utility which are presented in the following order:

- Governance and organizational structure
- Strategic planning and performance information management
- Customer services
- Budgeting and financial management
- Human resources development and training, and personnel management
- Management information systems
- Facilities operations, maintenance, and management
- Technical services

Governance and Organizational Structure

Current Barriers to Fulfillment of Organizational Mandate

For CGOSD to achieve its mission, it is necessary to have all core functions fully integrated, well managed, and performing efficiently. Thus, structure helps translate the mission of an organization into practice. It aids in the understanding of working and reporting relationships. It makes clear where responsibility and accountability lie for various functions. Lastly, and most importantly, it aids in communication.

CGOSD is a governmental organization. As such, it is dependent on systems and regulations developed and administered by central government agencies or the governorates. The objective of Presidential Decree No. 95 of 1994 was to set the new CGOSD on an independent path in carrying out its projects on an economic basis within the general policy of the state. The existing governance and organizational structure, however, does not encourage or allow the organization to function on an autonomous, economic basis.

The recommendations made here should be viewed as the beginning of a process of ultimate acceptance of the autonomous organizational structure by the Government of Egypt and ownership by the leadership of CGOSD. While the recommendations for governance require external reforms, the organizational structure recommendations can be accomplished within the existing legal framework establishing CGOSD.

Opportunities for Improvement within the Current Constraints

Governance Change. Administrative independence involves a transfer of responsibility and authority from the central government to CGOSD. This requires that the utility have a governance structure capable of assuming this responsibility and authority on behalf of the public. To that end, it is recommended that the Board of Directors be re-constituted and the Chairman of the Board of Directors also serve as the Chief Executive Officer (CEO) of the organization.

Independent, External Board of Directors. The reconstituted Board must be capable of independence in its financial business decisions, responsive to the public interest, forward thinking in its policy development, and capable of managing the organization through the chairman and staff.

While CGOSD is, and will remain, a public function, it must operate very similarly to a business. The Board should be authorized to conduct its responsibilities without the necessity for consent from any outside person, board or authority, with one exception. The Board would have the right to propose rate and tariff changes and submit proposed tariffs to a committee of the governorates for final approval.

Chairman as Chief Executive Officer. The Chairman of CGOSD functions with multiple responsibility roles when compared to a typical, large organization. Currently, he serves as Chairman of the Board; Chief Executive Officer of the General Organization; and Chief Operating Officer (COO) relative to the day-to-day operation, maintenance, and management of CGOSD. Lastly, he is the chief arbitrator of all complaints and disputes within the organization.

There seems to be a consensus among senior management that the span of control of the chairman's office is too wide and his time is overly absorbed with routine operational matters.

Moreover, CGOSD, as an economic authority, will have a need for revenue and rate-recovery analysis, as well as for public education and awareness about benefits received. It is important for the success of the organization for the chairman to act as Chief Executive Officer, focusing his time and energy on the future and strategic issues of the organization, intergovernmental relations and performance management.

Creation of a Chief Operating Officer Position. To achieve the effective operation and management of the wastewater system, while also achieving economic self-sufficiency, a streamlining of the operation will be required which clearly supports the core functions of wastewater collection, treatment, and safe disposal. To that end, it is recommended that a new position be created to function as the Chief Operating Officer of CGOSD.

The COO would be second in command and the main operating departments of CGOSD would report to him. He should assume responsibility and be given full delegation of authority in the following areas:

- Overall operational leadership

- Organizational performance review
- Routine management decision-making
- Coordination and communication across the entire organization

In the near term, this position will need to be filled on a contractual basis, from either inside or outside of CGOSD until the staff planning can be changed consistent with Article 12 of Decree No. 95 of 1994. The position would report to the CEO.

Perform Core Business at the Sector (Customer) Level. The mission of CGOSD is to safely collect, treat, and dispose of wastewater. This is the heart of the organization - its core business.

It is recommended that CGOSD build upon and refine its existing unofficial organization by incorporating two main organizing principles:

- Organize the core work of CGOSD into geographic sectors so as to be more responsive to customer needs.
- Orient the rest of the organization toward support of the core business.

The managers of the sectors and main departments would report directly to the Chief Operating Officer. CGOSD is currently divided into four sectors. The number might be expanded as the service area of CGOSD increases. The leader of each sector would be expected to provide environmentally sound, economic wastewater collection and treatment services for the customers of that area with each sector being a customer service office. More specifically, the sector manager would:

- Provide for the reliable collection and pumping of wastewater for all of the customers within the sector;
- Provide for cost effective wastewater treatment in compliance with established standards;
- Meet customer service satisfaction standards; and
- Meet performance standards, such as optimizing the unit cost of all aspects of the systems within the sector.

The sector manager would be the decision-maker of all operational issues within the sector. He would have additional decentralized responsibility and authority for routine, day-to-day, non-specialized services, which are necessary for system performance. These decision areas include: supplies and parts, vehicle maintenance, laboratory services, transportation, facility maintenance, and staffing.

Sector managers would be supported by centralized, specialized services. For example, in maintenance the sector managers would have authority for corrective and preventive maintenance, including Level 1 and 2 maintenance. The central organization would serve

the sectors by doing specialized, major repairs, involving specialized equipment and knowledge. This would include major maintenance, including overhauls.

CGOSD financial strategy should seek to empower lower level units with greater budgetary discretion and hold them accountable for financial programmatic results. Thus, as the sectors take on the essence of CGOSD's mission, they need to take on commensurate financial responsibility. The recommended financial responsibilities of the sectors are:

- Cost center based financial management;
- Budget development for the sector; and
- Spending decisions within sector budget limitations.

Strategic Planning and Performance Information Management

Current Barriers to Fulfillment of Organizational Mandate

A wastewater utility such as CGOSD is both capital and labor intensive. It is constantly faced with new and growing demands for service, while having to comply with increasingly more stringent discharge standards. CGOSD will not be able to fulfill its organizational mandate and make the critical decisions relative to the application and use of resources, without an organized, properly staffed, and fully documented strategic planning and performance information management functions.

Currently, CGOSD does not have a formal strategic planning group or framework. The absence of this functional area is a major barrier toward sustaining the cost effective operation and maintenance of CGOSD. If the current situation is allowed to continue, it will ultimately lead to increased system inefficiency and a decline in performance levels in serving the customers.

Opportunities for Improvement within the Current Constraints

Create the Office of Strategic Planning. An Office of Strategic Planning, reporting to the chairman, should be created to manage the strategic planning process of the organization and to support the strategic management decision making process of the chairman and the Board of Directors. The principal responsibilities of this office include the following:

- Summarize needs and establish priorities for critical actions affecting infrastructure expansion, replacement, and improvement;
- Analyze and evaluate future capital needs and O&M cost trends;
- Analyze and evaluate future personnel staffing levels, skills needs, and development and training needs;
- Prepare revenue forecasts and capital financing options;

- Prepare five-year strategic plans for presentation to the Board of Directors and update annually; and
- Prepare and present strategic plan implementation recommendations to the chairman.

Prepare a Strategic Plan. Since the creation of the Office of Strategic Planning could take time to implement, it is recommended that a consultant be retained to prepare an initial plan immediately, that could be serve as a model for future plan development.

Create an Office of Performance Information Management. An Office of Performance Information Management should be created, by restructuring and refining the existing Department of Follow-up and Performance. Its manager would report directly to the chairman to ensure freedom of reporting. The functions of the office would be designed to provide the necessary data, information and analyses to the chairman to answer the question, of how CGOSD is doing.

The office, however, would work closely with all functional managers not only to monitor the performance of their units, but also to assist them in identifying the causes of non-performance and appropriate solutions for improvement. The office would establish the parameters for bench marking the performance of CGOSD so that the managers at all levels will have quantifiable inputs to support a program of continuous performance improvement.

This cooperative team approach would reinforce the concept that optimal utility performance is everyone's responsibility, and the Office of Performance Information Management is not a policeman seeking to identify the guilty party.

Establish Performance Information Management System. To support the Performance Information Management Plan, a formalized system for measuring, tracking, analyzing, and correcting performance of all elements of the organization must be established. This system would use all the information gathering and dissemination capabilities of CGOSD to undertake the following:

- Develop and update clear and measurable performance indicators and targets;
- Measure performance and customer satisfaction;
- Analyze performance problems;
- Provide reports to senior managers, the COO, and the CEO of performance problems with recommendations for correction;
- Issue corrective action directives; and
- Evaluate the effectiveness of the corrective actions taken by senior managers

Customer Services

Current Barriers to Fulfillment of the Organizational Mandate

In terms of the customer service function, there are no obvious barriers to the fulfillment of the organizational mandate. CGOSD can take, and has the authority to take, all of the actions needed to fulfill its organizational mandate within this functional area. Although on the face of it, funding may be a constraint, this can be viewed more as a cost-effective allocation of resources challenge, rather than an outright constraint.

Opportunities for Improvement within the Current Constraints

Since there are no obvious barriers to the fulfillment of the organizational mandate in the area of customer service, then the assessment items presented in Subtask 3 of this report can be undertaken by simply directing that they be addressed or by the reallocation of resources to achieve the desired improvement. Specific actions that could be taken include the following:

Decentralize Sewer Connection Application Process. Since the application for sewer connections is the beginning of the customer service relationship, then the access to CGOSD by the potential customer should be as convenient as possible. To achieve this, the sewer connection application process must be decentralized to the sector level.

Sewer Connections by the Private Sector. Implement a program that will certify private contractors for the installation of new sewer connections. A potential customer would still go through an application process with CGOSD and pay an application fee, but the preparation of documentation, as well as the filing of the application, would be done by the certified, private contractor. CGOSD would require that a CGOSD inspector be at the site during the construction.

Customer Complaint Documentation. Standardize the customer complaint process throughout CGOSD in terms of the type of data recorded, the forms on which they are recorded, and the reporting procedures up through the CGOSD organization. Follow this with the implementation of a computer-based system that will allow for more rapid and accurate reporting, better work order generation and work completion feedback, and customer complaint analysis to identify areas having repeated problems, with the objective of identifying root causes of problems.

Implement Customer Service Training for CGOSD Employees. In a system as large as the CGOSD's, and with the many internal functions that must take place to maintain daily operations, it is understandable that the employees can forget that their sole purpose, in the performance of their duties, is to serve CGOSD's customers in providing a valued, essential service. For this reason, it is strongly recommended that CGOSD implement a continuous program of customer service training at all levels of the organization that will reinforce the priority that CGOSD places on customer service.

Maintenance Crew Transport. Design a program of improved and safer maintenance crew transportation to get crews to problem locations in a timely manner.

Maintenance Crew Equipment. Review the current equipment used by the maintenance crews (manual rods) and research other options, such as small, portable, electric/gas powered mechanical cleaning equipment for faster, safer cleaning.

Public Awareness/Public Education. Review the public awareness and public education programs to assess how greater investment in these programs would save money in the longer term through improved customer use of the sewerage system.

Budgeting and Financial Management

Current Barriers to Fulfillment of Organizational Mandate

The following are understood and acknowledged to be barriers to the fulfillment of the organizational mandate of CGOSD “to conduct its projects on an economic basis, within the framework of the general policy of the State, in order to realize the balance between its resources and expenditures.”

Tariff Setting. Lack of a rational tariff setting process that is based on a business understanding of the cost of service, and the need to invest in infrastructure to serve and protect the health of the customers of CGOSD.

Cost Effective Staffing. Lack of authority within the CGOSD management to determine the proper level of staffing needed to fulfill its mandate, to assign personnel to positions based on proven qualifications and demonstrated ability, and to set compensation for positions based on competitive market rates for the skills required.

Manually Prepared Financial Reporting. The requirement of the Ministry of Finance to require manually prepared financial reports, which do not ultimately support the management needs of CGOSD and can contribute to inefficient and costly operations.

Opportunities for Improvement within the Current Constraints

Although the constraints itemized above are real and significant relative to the functionality of the Finance Department, there are specific actions that can be taken to improve the current operations and make the finance function, within CGOSD, more productive in support of the mandate of CGOSD. These opportunities for improvement are as follows:

Computer-Based Accounting. Work with the management information systems group to get available hardware located in the Finance Department, and have MIS group conduct training, as necessary, to have the capability to transition to a computer-based system.

Cost-Center-Based Accounting. Plan and design a cost-center-based budgeting and accounting system and immediately implement it with the technical support of the MIS group. Continue to maintain a parallel manual accounting system but conduct it using the cost-center-based budgeting and accounting system structure designed above.

Relocation of Stores Function. The philosophy that stores must be guarded, and the issuance of spare parts and supplies should be made difficult is no longer associated with

responsible utility management. Stores, as a physical location, must be under the control of the various sector managers. Stores as a management and standards setting function would come under the control of technical services.

Human Resources Development, Training, and Personnel Management

Current Barriers to Fulfillment of Organizational Mandate

Development and Training. A paradox exists universally with human resources development and training. In emerging economies and even in some developed ones, while everyone seems to agree that staff development and training are important to a business or organization for optimal performance, this premise very often does not materialize to actual support of the training function. And when, mainly as an external intervention, training is provided, it is done so mechanically and without being treated as a remedy to a performance problem. This type of training is as ineffective as a lack of training. Moreover, it contributes to the cynicism of those not convinced of the benefits of training that “after all the training being provided for many years, things are still not done properly.”

CGOSD staff appears to have acquired the necessary technical skills and knowledge to run the existing collection and treatment system and are performing this function adequately. Additionally, they have been introduced to maintenance management and trained on how to provide preventive and corrective maintenance. There are several functional areas, i.e. long-range planning, financial planning and management, and personnel management, which will require performance-based staff training. No action, or wrong action, as the case might be in this area, will have serious negative consequences for the sustainability of the entire system.

Personnel Management. The current essential barrier to fulfill the organizational mandate to operate on an economic basis is the lack of authority for CGOSD to determine the size, composition and compensation levels of its workforce. This authority rests with the CAO.

Personnel Safety. As currently organized, the CGOSD safety officer is not consulted about safety issues during the design phase of new project developments. The most serious personnel safety issue is associated with poor habits of personal hygiene leading to employee illness and disease. Changing that cultural artifact of the wastewater worker's upbringing will be hard to achieve.

Opportunities for Improvement within the Current Constraints

The purpose of CGOSD's wastewater infrastructure is to treat wastewater for the protection of public health and environment; the purpose of O&M is to ensure that the infrastructure fulfills its purpose; and the purpose of the administrative, financial, and technical support functions of the organization is to ensure the O&M activities are implemented in an efficient and cost-effective manner. For CGOSD to meet its goal, it is necessary to have all its administrative, financial, and technical functions fully integrated and performing efficiently toward that common goal. Facility performance and organizational performance in general

are, therefore, the standards of measuring the effectiveness of CGOSD in meeting its mission as a wastewater utility.

The two most important assets of CGOSD are its facilities and its personnel. The facilities represent a significant public investment, which must be operated and maintained properly, and protected for future use. The personnel represent a vital human resource necessary for the proper management of the organization and operation and maintenance of the facilities. Having a competent work force with the appropriate skills and knowledge to carry out its tasks, is therefore, a significant factor for a successful CGOSD.

To that end, new financial, administrative, and technical systems are being developed to improve the overall performance of the utility. Implementation of the new systems requires that CGOSD employees receive training and technical assistance in how to use them. To train the personnel in the new skills and knowledge required to use the new systems and operate the facilities at optimum performance levels for years to come, a comprehensive training program must be employed. The foundation of such a training program is an Integrated Training Strategy (ITS).

Integrated Training Strategy. ITS is a performance-based approach that integrates training and technical assistance with the organizational and operational performance of the utility. Using operational and organizational performance criteria (indicators) as its guide, the Training Unit works closely with the Office of Performance Information Management to address performance deficiencies that can be remedied with training.

A coordinated and ultimately fully integrated system should be established to provide formal communications and organizational links between training and technical assistance programs and the Performance Information Management System. This approach should ensure coordinated, timely, and most appropriate responses to facility noncompliance, create incentives for compliance, and provide the means to resolve training-related organizational performance deficiencies.

Assessment of Training and Technical Assistance Needs. Training and technical assistance needs assessment should be a continuous process. However, CGOSD should formally assess needs at least annually, with quarterly updates that coincide with the review of facility compliance and organizational performance reports. The needs assessment should be based on diagnostic evaluations of compliance and performance problems, and determination of the types, quantity, and procedures for technical assistance and training needed. On-going training needs, including entry-level and in-service, outplacement training, and feedback from the trainers and trainees should also be part of the needs assessment.

Training Action Plan. An annual action plan should be developed linked to the needs assessment. At a minimum, the action plan should identify and set priorities for who will be trained, what training and technical assistance will be provided, who will provide it, how will it be provided, and what are the resources needed. The action plan should be reviewed by the Office of Performance Information Management and serve as the basis for developing and justifying the annual training budget.

Training Delivery System. A delivery system should be developed and coordinated among training entities. The system should reflect all aspects of training delivery, including conventional and on-site instruction, curricula, instructor qualifications, instructor incentives, delivery methods, technical content, and training materials. CGOSD needs to manage and coordinate training delivery directly through the training centers and outside sources to ensure programs meet identified needs, and are oriented to assuring compliance and performance.

The training program and delivery system should ensure a balanced mix of entry level and in-service training and technical assistance. CGOSD should establish quality control criteria for courses and training and technical assistance materials; periodically evaluate courses, materials and instructors; and maintain and distribute a list of approved courses and materials.

Management Development Program. The training and development needs of management and supervisory personnel are very important during times of major organizational changes. This continues to be true after the changes have been incorporated to ensure the organization remains focused on its mission and makes the best possible use of all its resources.

A management development program should include existing managers as well as employees who have been identified as future supervisors and managers. Given the large number of supervisory positions within CGOSD, a large effort needs to be made to see that these employees, who generally are specialists in the technical aspects of their jobs, are also trained to effectively supervise their subordinates.

Computer-Based Employee Records. The entry of all employee records should be completed and proper procedures for data base updating and verification should be developed.

Revised Staffing and Compensation Plan. Based on the authority defined under Article 12 of Decree No. 95 of 1994, CGOSD should work constructively with managers in all departments and sections to define the optimal staffing plan and skills needs for CGOSD. Based on this new plan, the senior management should review and modify salary ranges as needed to both attract and maintain key skills at all levels of the organization. This plan should be presented as a united and cohesive staffing plan to CAO, for final approval by the Cabinet of Ministers.

Safety Design Review. The chairman could direct that all new facility designs must be reviewed by the safety officer at the 90% completion level so that safety issues can be considered and resolved at the final design stage.

Hygiene Training. CGOSD should implement a comprehensive training program focused on teaching good hygiene practices for workers who work around wastewater and sludge.

Vaccination of CGOSD Personnel. All CGOSD field personnel who may come into contact with wastewater or sludge must be vaccinated for hepatitis, tetanus and other diseases that may be transmitted through wastewater.

Accident Reporting and Prevention. The accident reporting system should be reviewed and revised to ensure that complete and accurate data is being collected and analyzed to identify dangerous work situations and practices. Unsafe conditions can be corrected by initiating cleanup campaigns and authorizing projects that will reduce the potential for accidents.

Revise and Issue Safety Manuals. All safety manuals should be republished and redistributed to the plants, with responsibility for maintaining them assigned to the facility safety officer at each facility.

Re-evaluate On-Site Safety Training. The frequency and content of on-site safety training should be reviewed and modified to increase its impact on the work force.

Management Information Systems

Current Barriers to Fulfillment of Organizational Mandate

The barriers to fulfilling the organizational mandate of CGOSD in this functional area are largely self-imposed and cultural in nature. From that perspective, the following internal barriers must be overcome:

- **Staffing Level, Skill Needs and Compensation** — Admittedly, there is a need to negotiate with the officials at CAO A to define a new set of standards and wage scales for the type of individuals needed to staff the Computer and Information Department, but this is within the authority of CGOSD.
- **Cultural Acceptance of MIS** — All of the senior managers must buy into the concept and knowledgeably support the movement to full implementation of MIS.

Opportunities for Improvement within the Current Constraints

The opportunities for improvement today, under the MIS area, are no different than they were when CGOSD initiated its programs, with USAID assistance, to acquire a computer based management information system. The key point to emphasize here is that the MIS function is a staff function and not a line function. In that regard, it is in a support role and is driven by user demand. Some specific actions would include:

Staffing, Management and Compensation Structure. Move rapidly to properly restructure, staff, and compensate the personnel assigned to the Computer and Information Department. Place a full-time director in charge of the department. If these internal changes cannot be accomplished, institute action to have the entire department managed and staffed by a contracted, private sector service provider.

Institute Management MIS Committee. Form a standing committee of all senior managers of CGOSD, who will serve like a Board of Directors over the Computer and Information Department and monitor and review its progress quarterly.

Institute Communications Advisory Committee. Form a communications advisory team in each sector of CGOSD to develop a clear understanding of the communications needs all the way down through the organization and use their advise as a basis of forming a more aggressive communications plan.

Facilities Operations, Maintenance, and Management

Current Barriers to Fulfillment of Organizational Mandates

The following conditions constitute institutional barriers to successful operation, maintenance, and management of the collection systems and treatment facilities and the achievement of process and system optimization:

- Organizationally, the chairman makes all decisions regarding upper management and the approval of requests to spend money to improve operations. This places such a large burden on the chairman that required actions get done slowly or not at all.
- Managers do not have the authority to make key decisions regarding the improvements or repairs at their facilities.
- Under Egyptian general laws, no one can be fired and promotions are usually based on seniority, rather than qualifications and competence.
- Since the managers making recommendations may not fully understand the treatment processes they are managing, and the engineers who do understand them are not compensated adequately, there is no incentive to analyze and correct problems when they occur.
- The inventory and work order systems are largely carried out manually because the computer programs that operate the MP-2 data base and reporting system are not fully functional.
- There is no budget for completing the MP-2 system for all facilities and stores.
- Maps and infrastructure records appear to be incomplete or out of date.
- Trained personnel are paid too little for their services and therefore do not put in the effort to perform to their full potential.

Opportunities for Improvement within the Current Constraints

Within the above constraints, the chairman has some options with regard to the hiring of personnel or the contracting of services, as follows:

- If the chairman believes that the sector and facility managers, currently assigned, are not fully qualified to manage their positions, he is permitted to hire qualified staff, under contract, and give them the responsibilities for operating the sectors or facilities.

- The chairman must find ways to reduce the number of requests he must consider and act upon by delegating more authority to sector and major facility managers. This should include raising the expenditure authority to the LE 50,000 range, so long as the expenditures are included in an approved budget.
- Identify the staff members with the skills required to implement the MP-2 system and form a unit with the assignment to complete the system for stores and all major facilities. They should be paid appropriate bonuses for their accomplishments, not their efforts. These skills do not currently exist in the Computer and Information Department.
- Designate funds for all aspects of the application of the MIS program including both the MP-2 and computerized mapping efforts in future annual budgets.
- Establish a commitment to eliminate the discharge of untreated wastewater and sludge to any drainage channel or water body in the CGOSD service area by planning and implementing a program for the expansion of facilities to meet that objective.
- Repair and balance the existing effluent pumps at Abu Rawash WWTP, as soon as possible, and add two pumps to provide for a total of 10. This should provide sufficient standby pumps to allow six pumps to be operating at all times. The plant can then be operated up to its peak design capacity of 600,000 m³/day and still have two working pumps on standby. This should eliminate the need to bypass, even when the new service area comes on line within a few months.
- Authorize the sector managers to approve purchases and requisitions stores up to LE 50,000, so long as the item has been included in the approved annual budget. The Sector Managers should also have the authority to delegate purchasing responsibility to the WWTP managers for purchases up to some significant value like LE 2,000, so long as the item is included in the annual budget. Purchases exceeding LE 50,000 should require the approval of the chairman.
- Dried sludge should be sold to developers, after it has been stored for sufficient time to be stabilized and become relatively free of pathogens. If the dried sludge is to be sold and used on food crops, supporting studies should be conducted by CGOSD to define limits on heavy metals in the sludge.
- The sludge thickening system at Abu Rawash is not functioning and sludge from Zenein is being discharged to an emergency holding pond or overflows to the drain. Outside expertise should be retained to determine why it is not functioning and how to correct the problem if changing the sludge age and reducing the holding times at Zenein do not correct the problem as they have in the past.

An alternative to be evaluated would be replacing the 15 km cast iron pipeline from Zenein to Abu Rawash with a high pressure pipeline. The Zenein sludge could then be pumped to Abu Rawash in its thickened state, just as it is pumped from Abu Rawash to the desert lagoons. Then thickening at Abu Rawash would not be required. The

existing cast iron force main from Zenein is reported to be old and suffering from corrosion and periodic breaks and will probably have to be replaced soon anyway.

- Develop a method to lock ductile iron manhole covers so they cannot be easily removed by citizens trying to dispose of materials to the sewer, or those where the problem is occurring more frequently should be replaced with cast iron covers.
- The 24 unused bucket machines in mechanical cleaning stores should be evaluated to see whether they can be economically modified to operate in Cairo manholes and sewers. If they cannot, they should be declared surplus and sold.
- Cleaning grit from lines appears to be a major time consuming task. Alternatives to the extended use of bucket machines should be evaluated, including the use of hydraulic bag devices in larger lines. It may also be necessary to construct more grit removal pits or hydraulic grit separators adjacent to sewers with high grit loads and flat slopes.
- The inventory system should be computerized. Commit funds and personnel to completion of the coding and computerization of supplies in stores as rapidly as possible. An effective computerized database for parts and materials will reduce down time and wasted effort trying to find parts when they are needed.
- An outside technical support service should be obtained to help CGOSD staff complete the MP-2 maintenance programs for scheduling preventive maintenance. A language conversion program must be included so that instructions can be given to workers in Arabic.
- The computerized mapping system should be completed so that all sewer reaches and manholes are clearly identified and the data about them is made accessible to maintenance and repair crews.
- The use of outside service contracts should be expanded to provide support for computer program development and maintenance.
- The 87 vehicles unable to be repaired taking up space in the vehicle maintenance yard should be scheduled for sale as scrap.

Technical Services

In developing this chapter of the report, the assessment team has chosen to redefine the technical services function to have a much broader role than is currently envisioned or practiced by CGOSD. In this redefined role, it is intended that technical services be a direct support service to many of the functional areas of CGOSD to include operation and maintenance, capital planning, and strategic planning.

The functional responsibilities of the redefined technical services department would include the following:

- Facility needs assessment and planning
- Conceptual engineering and design management of major projects
- Repair and rehabilitation engineering design and specifications
- Technology evaluation and research
- Project management and construction inspection
- Laboratory services and compliance monitoring
- Computer and information services
- Stores management and procurement specifications
- Maintenance management planning and program development
- Specialized technology services

Current Barriers to Fulfillment of Organizational Mandate

Although the technical services function has been redefined in this chapter of the report, there are still no major external barriers that would prevent CGOSD from acting on improvements in this area. These functions already largely exist in various areas of the current CGOSD organizational structure. What is missing, however, is the actual management structure and practices of CGOSD to perform these activities as a service to the utility. Stated another way, what is missing is direction, coordination, planning, delegation, and follow-up.

From an environmental compliance and monitoring perspective, there are some limiting current conditions that negatively impact performance. These would include:

- The difficulty in developing or coordinating laws and regulatory efforts among involved ministries of the Government of Egypt;
- The apparent success of the current program to get raw sewage into the collection system has removed the pressure to take the next steps in protecting the environment from wastewater pollution; and
- The insufficient wastewater treatment capacity for all wastewater now entering the collection system.

Opportunities for Improvement within the Current Conditions

- Develop an organization, management and staffing plan for the redefined Technical Services Department of CGOSD. Prepare a skills assessment of the personnel in the current Projects Department to determine how these resources can be utilized in the redefined Technical Services Department.
- The design engineering areas should be gradually decrease in size, until there is a small, highly skilled engineering and design group representing all technical disciplines: civil, mechanical, electrical, and environmental. The unit would confine its own direct work to routine, smaller-scoped engineering services. But its main responsibility would be to do operational capacity analyses and design review.

- The Technical Department should include a cadre of highly specialized and skilled engineers and technicians who provide technical support to the entire organization in the areas of:
 - Corrosion control
 - Vibration analysis
 - Calibration of equipment
 - Instrumentation and control
 - Computer technology
- Provide a budget to ensure that laboratory personnel have the equipment and chemicals to perform all required analytical monitoring tests.
- Expand the quality assurance/quality control (QA/QC) program for wastewater treatment plant laboratory data to assure that the information being developed is accurate and reliable. The laboratory database should be integrated and interconnected among laboratories.
- Adopt standards for industrial discharging into the sewage collection system. The standards should be sufficient to protect the treatment plants from hazardous or toxic materials but allow increases in TSS and BOD which will be paid for by the industries in their surcharges. Limits on heavy metals should be established so that CGOSD's processed sludge can be used safely for food crops.
- Where it is suspected that industrial wastewater dischargers are discharging larger quantities of wastewater than they are paying for, they should be required to install effluent flow meters, rather than relying on a uniform factor of 60% of their purchased water quantities.

CHAPTER 5 IMPLEMENTATION STRATEGY

Operational and Financial Sustainability

The mission of CGOSD is to protect public health and the environment through proper wastewater collection and treatment, and environmentally safe disposal. Although significant progress has been made by the utility in the past fifteen years in meeting its mission by transporting wastewater away from its sources, based on the findings of this assessment it is safe to conclude that the mission of CGOSD is not fully met. A considerable portion of the wastewater collected still receives no treatment.

Operational Sustainability

It appears that the priority of CGOSD in its operational and management practices is to transport wastewater away from the homes, businesses and institutions, which is not a minor task for a complex and aging urban center of more than fifteen million residents and workers. The assessment revealed (as it is presented in detail in Chapters 3 and 4 of the report) that the system is currently running, in the sense that it pumps wastewater. However, it is slowly, but steadily, deteriorating because of a lack of proper operation and maintenance.

A high probability exists that this insufficient proper operation and maintenance, or insufficient spare parts, will result in operational failure of a major pump station or wastewater treatment plant causing wastewater back ups or spills over large areas of Greater Cairo. This operational failure could happen within the next five years.

Financial Sustainability

Additionally, the near-term capital needs plus the rapidly rising operations and maintenance costs will only result in a larger national subsidy which undermines the credit-worthiness of the utility. If this condition were to continue without any intervention, under funding of capital and/or O&M expenses will occur which will result in a reduced level of services.

Policy Actions Required

Action 1 - Change CGOSD Governance

In order for CGOSD to effectively exercise the powers and responsibilities intended under Presidential Decree No. 95 of 1994, which formed CGOSD, there is a need to authorize CGOSD under a piece of new enabling legislation. This legislation should provide CGOSD with the autonomy to perform on an economic basis as a viable, self-sustaining utility, and place responsibility for its operations in a reconstituted Board of Directors.

The new Board of Directors should be constituted so as to be more responsive to the public interest and to better represent the classes of users (industry, agriculture, tourism, etc.),

environmental and natural resources interests, as well as the Governorates of Greater Cairo and other relevant stakeholders.

Action 2 - Private Sector Participation

Utilize outside expertise through service contracts and management contracts to assure that the facilities are operated optimally, that maintenance is performed effectively, that appropriate spare parts are purchased and stored on site, and that the MIS system is completed and maintained.

CGOSD is at a critical stage in both moving toward full financial sustainability, while effectively utilizing and protecting a significant investment in capital facilities.

Given the challenges presented by these two issues, CGOSD should seriously consider engaging the services of a private sector service provider to operate and maintain all of its treatment plants and pump stations under a performance based contract for a period of ten years. This contractor should be given a free hand to staff these facilities with the number of staff that he feels are needed to do the work, however this staff must be recruited from existing CGOSD staff. All staff not selected to work for the private sector service provider would be guaranteed employment with CGOSD.

Technical Assistance Actions Required

Action 1 - Organize and Implement Strategic Planning for CGOSD

Establish and staff an Office of Strategic Planning within CGOSD to assist the management and Board of Directors of CGOSD in the setting of priorities and the allocation of resources to fulfill CGOSD's mandate. The specific technical assistance support needed would achieve the following:

- Define and prepare a staffing plan
- Develop the initial annual planning schedule
- Prepare the initial strategic plan

Action 2 - Restructure Organization to Focus on Core Business

Restructure the CGOSD organization according to the core business of CGOSD, and orient the rest of the organization toward the support of the core business. To that end, the restructuring would entail two key elements:

Empower Sector Managers and Cost Center Managers. The sector manager would be the decision-maker for all operational issues within the sector. He would have additional decentralized responsibility and authority for routine, day-to-day, non-specialized services, which are necessary for system performance. These decision areas include such items as supplies and spare parts, vehicle maintenance, laboratory services, transportation, facility maintenance, and staffing. Beyond the sector manager, cost center managers would also be empowered to manage budgets within their area of control.

Establish Technical Services Department. This new department, which is described in more detail in Chapter Five, would be structured to support all core business and include laboratories, industrial wastes, stores (central), MIS, monitoring, and compliance reporting.

The outside technical assistance services needed in this area would include the following:

- Provide shadow management advisory services for empowered managers and technical services;
- Assist in budget planning and cost center report analysis;
- Prepare a manpower staffing and resource allocation;
- Assist with meeting management and shared decision making; and
- Prepare organization structure and staffing plan for technical services

Action 3 - Achieve Financial Sustainability

Creditworthiness is essential for the financial viability of CGOSD. To achieve this, CGOSD must restructure its financial operations around the basis of an enterprise fund concept with a total commitment to cost-center-based budgeting, accounting and controls. If overstaffing of CGOSD is a political mandate, the financial management of CGOSD must be able to reflect that its core business utility economics are in balance between revenues and expenses. The key items of a scope of services for technical assistance in this area would include:

- Implement financial management system
- Convert to cost-center based accounting
- Convert to full computer based accounting

In addition, serious consideration should be given to contracting with the private sector to staff and operate the Computer and Information Department. This area is currently a problem for CGOSD to staff and requires unique skills that are difficult for CGOSD to attract.

Action 4 – Fully Implement the MP-2 Maintenance Management System and Associated Computer-Based Programs

An immediate improvement in the maintenance of the capital investment made in the Cairo wastewater system is critical at this time. To achieve this, the O&M staff must be given the tools needed to perform their activities cost-effectively. This requires immediate attention to the completion of the installation of the MP-2 Maintenance Management System, the installation of the inventory control system, and the completion of the development of the collection system mapping program.

CGOSD Internal Actions Required

There are a number of actions that CGOSD can take today which are not constrained by any laws or regulations outside CGOSD. Chapter Four of this assessment report describes these actions as recommendations for each of the key eight functional areas of the CGOSD wastewater utility. The following are high priority areas in that regard:

- Action 1 – Create and staff the position of chief operating officer.
- Action 2 - Properly staff and compensate positions in computer and information department.
- Action 3 - Establish the office of performance information management and develop a performance information management system.
- Action 4 – Redefine the customer service function and focus at the sector level.

APPENDICES

APPENDIX A ACRONYMS

BOD	Biochemical Oxygen Demand
CAOA	Central Agency for Organization and Administration
CEO	Chief Executive Officer
CGOSD	Cairo General Organization for Sanitary Drainage
COO	Chief Operating Officer
GOE	Government of Egypt
GOGCWS	General Organization for Greater Cairo Water Supply
ISC	Institutional Support Contract
ITS	Integrated Training Strategy
IWD	Industrial Waste Department
LE	Egyptian Pound
MIS	Management Information System
MLSS	Mixed Liquor Suspended Solids
MOF	Ministry of Finance
MP-2	Management Planning - 2
MPN	Most Probable Number
O&M	Operation and Maintenance
QA/QC	Quality Assurance/Quality Control
RAS	Return Activated Sludge
SO	Strategic Objective
TSS	Total Suspended Solids
USAID	U.S. Agency for International Development
WWTP	Wastewater Treatment Plant

APPENDIX B

GREATER CAIRO GENERAL ORGANIZATION FOR SANITARY DRAINAGE

STAFF CONTACTS

Office of the Chairman

H.E. Mohamed El Said Youssef	Chairman
William Riad	Manager, Follow-up and Performance Evaluation
Mohamed Abdel Azim	Specialist, Inspections
Enayat Abdel Salam	Director, Public Relations
Salwa Mohamed Hussein	Specialist, Public Relations
Ali Mansour	Director, Customer Service
Mahmoud Hanafi Mohamed	Customer Service Specialist
Engr. Sami Khafaqa	Head of Training
Dr. Samir Ismail	Director, Computer and Information Department
Engr. Sahem Balatis	Manager, Planning Department
Engr. Mostafa Abu Shady	Manager, Central Emergency Room
Engr. Hamed Wali	Manager, Emergency Room, West Bank

Operations and Maintenance Department

Engr. Mohamed Abdel Rahman	Vice Chairman O&M Central Department
Engr. Saleh Wanis	Head of Industrial Waste
Engr. Magdi Al Dahan	Head of Safety
Engr. Samir Abdel Moniem	Manager West Sector
Engr. Mohamed Abdel Haie	Head Zenien Wastewater Treatment Plant
Engr. Mohamed Samir Abdel Rassoul	Head of Connections
Engr. Moris Roushdi	East Sector Manager
Engr. Ahmed Gamal	West Sector Project Manager
Engr. Abd El-Hafeez Ismail	Gabal El Moheet Pump Station
Engr. Mostafa Mohamed	Maintenance Manager, Zenien WWTP
Engr. Sami Youssef	Asst. Manager, East Sector
Engr. Badwi Mansour	Head, Mechanical Cleaning Department
Engr. Alaa Abdel Sadik	Deputy Manager, Ameria Pump Station
Engr. Mohamed Khatab	Manager, Berka WWTP
Engr. Samir Abdel Hakeem	Berka Technical Office
Chemist Abd Allah Kaoud	Director of Lab and Research
Chemist Yehia Ibrahim	Asst. Manager, Lab and Research
Engr. Mohamed Samir Abdel Rasoul	Manager, Building Connections
Engr. Mohamed Mahmoud Mekki	Assistant Manager, Eastern Sector

Finance Department

Fatma Turk
Ali Metwally
Nazih Tawfik
Radwan Abdel Fattah

Director General of Finance
Director of Accounts (RMOF)
Inspector of Stores
Storekeeper, Vehicle Spare Parts

Personnel Department

Farouk Abdel Monsef
Abdel Maksoud Ahmed
Abdel Hamid
Nadia Luis Abdel Malek
Sedika Ibrahim Thakib
Mona Farag Mostafa

Director General of Personnel

Manager of Service Affairs
Manager of Salaries
Manager of Records and Promotions
Salary Auditor

Projects Department

Engr. Khairy Morsi

Vice Chairman Projects Central Department

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